TokenLink® Velocity™ ISA Network Interface Card User Guide

A member of the high-performance TokenLink Velocity family

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Part No. 09-0964-001
Published August 1997

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About This Guide

About This Guide provides an overview of this guide, describes guide conventions, and tells you where to look for specific information.

Introduction

This guide describes how to install, configure, and troubleshoot the 3C319 TokenLink® Velocity™ ISA network interface card (NIC).

The HELP directory on TokenDisk® *diskette #1 contains the latest technical information.*

This guide is intended for network installers who are familiar with local area networking (LAN) technology, token ring technology, and network interface card installation.

If the information in the Release Notes shipped with your product differs from the information in this guide, follow the Release Notes.

How to Use This Guide

This table shows where to find specific information in this guide.

If you are looking for...	Turn to...
3C319 NIC features and product overview	Chapter 1
3C319 NIC installation and cabling procedures	Chapter 2
Installation and configuration roadmap for your environment	Chapter 2
NetWare client driver installation procedures	Chapter 3
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If you are looking for...	Turn to...
DynamicAccess Class of Service configuration procedures	Chapter 7
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Manual installation procedures for miscellaneous drivers	Chapter 8
Windows for Workgroups driver installation information	Chapter 8
Troubleshooting tips and procedures	Chapter 9
Specifications for cabling and connector pin assignments	Appendix A
Technical support	Appendix B

Conventions

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Alerts you to...
	Information note	Important features or instructions
	Caution	Risk of personal safety, system damage, or loss of data
	Warning	Risk of severe personal injury

Table 2 Text Conventions

Convention	Description
`Screen displays`	This typeface represents information as it appears on the screen.
Words in *italicized* type	Italics emphasize a point or denote new terms at the place where they are defined in the text.

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1 INTRODUCTION

The 3Com® TokenLink® Velocity™ ISA network interface card (NIC) is a high-performance card for PCs with an Industry Standard Architecture (ISA) bus or Extended Industry Standard Architecture (EISA) bus. This NIC is referred to as the 3C319 NIC in this guide.

High-Performance Features

The 3C319 NIC is designed for high network performance and trouble-free operation. This section describes the performance features of the 3C319 NIC.

DynamicAccess Class of Service

3Com's DynamicAccess™ features optimize network performance. With the DynamicAccess Class of Service feature, you can select the applications—such as multimedia sessions-—that require the highest-priority access to your network. Based on your selection, the network device driver recognizes high-priority applications and prioritizes their data transmissions.

The NIC implements dual queues to ensure that high-priority traffic gets transmitted before normal-priority traffic. When high-priority traffic is available for transmission, a high-priority token is requested.

Parallel Tasking Architecture

Parallel Tasking® architecture provides the industry's fastest performance by pipelining data between the PC and the network. Parallel Tasking technology improves network data throughput by overlapping processing tasks to speed data transmission and reception.

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For example, the 3C319 NIC begins writing the first portion of a data frame to the network before it has completed reading it from PC memory.

Full-Duplex/Dedicated Token Ring Support

Full-duplex/Dedicated Token Ring (DTR) is an enhancement to the IEEE 802.5 standard that allows a 16 Mbps switch port to be dedicated to a station.

In full-duplex mode, a station can simultaneously transmit and receive independent data streams for potential data throughput of 32 Mbps. The 3C319 NIC operates in full-duplex mode when attached to a DTR switch.

Other Features

- 100% compatibility with IBM legacy drivers and applications
- Full connectivity with IBM AS/400 and mainframe computers
- Plug and Play installation for ease of use in many PCs and advanced operating systems
- AutoLink™ software for easy installation of NetWare 16-bit client drivers
- Universal boot PROM for booting your computer remotely from a network server
- Diagnostic programs to aid problem solving
- CISPR B and FCC B certification for reduced electromagnetic interference when using either shielded twisted-pair (STP) or unshielded twisted-pair (UTP) cables
- Data rates of 4 or 16 Mbps over STP or UTP cables
- Auto ring speed detection option that permits the NDIS 4 driver for Windows 95 and Windows NT to detect and operate at the current ring data rate

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- Promiscuous mode support for the Windows 95 and Windows NT NDIS miniport drivers. In promiscuous mode, the NIC receives and forwards all network packets that arrive, regardless of the node to which they are addressed. Applications such as Microsoft Systems Management Server require the driver to be in promiscuous mode while they run. Promiscuous mode is automatically enabled and controlled by applications that require this feature. No user control is necessary.
- Easy configuration in 3Com mode for highest performance, or IBM mode with legacy IBM drivers

  3Com mode provides significant performance improvements by implementing Parallel Tasking architecture. Additionally, 3Com mode improves configuration flexibility by increasing the number of available IRQ channels to 8 and the number of I/O base addresses to 31. You can install up to six NICs per PC.

  IBM mode provides the same configuration options as IBM 16/4 Token Ring adapters: four IRQ channels and two I/O base addresses. You can use either 3Com drivers or IBM drivers in the IBM mode.
- Support for the following PC and network operating systems:
  - MS-DOS version 3.2 or later (Microsoft DOS LAN Manager, Banyan VINES DOS workstation, Banyan VINES 386 Server, IBM PC LAN Program, Novell NetWare DOS Requester, IBM DOS LAN Requester)
  - NetWare 2.1x or 2.2 (Novell NetWare 286 Server)
  - NetWare 3.1x, 4.1x, or later (Novell NetWare 386 Server)
  - Windows NT version 3.51 or later
  - Windows 95
  - Windows for Workgroups
  - IBM OS/2 version 2.0 or later (IBM LAN Server)

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- OS/2 version 1.x or later (Novell NetWare OS/2 Requester)
- IBM OS/2 EE version 1.1 or later (IBM LAN Server/LAN Requester, Communications Manager)
- MS-OS/2 version 1.x or later (Microsoft OS/2 LAN Manager)
- IBM OS/2 Warp or OS/2 Warp Connect

100% IBM Compatibility

The 3Com TokenLink Velocity ISA NIC is 100% compatible with any commercially available driver or application that functions with the legacy TROPIC chip-based IBM adapters.

If a 3Com TokenLink Velocity ISA NIC is not 100% compatible (as defined above) with any driver or application written to function on any IBM ISA Token Ring adapter, 3Com will refund the purchase price of the NIC.

If you believe your TokenLink Velocity ISA NIC is not compatible, contact the support group of the organization from which you purchased the NIC. For information about 3Com technical support, see Appendix B.

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2 INSTALLING THE 3C319 NIC

This chapter describes how to install the TokenLink Velocity ISA NIC (Part No. 3C319) in an ISA or EISA PC and how to connect the PC to the network.

Installation Requirements

Installation of the 3C319 NIC requires the following:

- An ISA- or EISA-bus PC with at least 640 K of RAM and an 80386, 80486, or Pentium processor.
- A 16-bit (ISA) or 32-bit (EISA) expansion slot.
- A high-density 3.5-inch floppy diskette drive.
- Category 3, 4, or 5 UTP or types 1 or 6 STP cabling.
- *TokenDisk* diskettes #1 and #2 containing the installation program, Configuration and Diagnostic Program, and drivers.

he Configuration and Diagnostic Program supplied on TokenDisk *diskette #1 is a DOS application. Before running the Configuration and Diagnostic Program, perform a clean boot from a DOS diskette or the hard drive's DOS option to ensure that no memory managers or drivers are loaded. The Configuration and Diagnostic Program will not run in a DOS window.*

- One of the PC and network operating systems described in the "Other Features" section of Chapter 1.
- Sufficient memory to load the 3C319 NIC driver from the network operating system. Depending on the LAN operating system, you may need additional free memory. Refer to your network operating system (NOS) documentation for exact memory requirements.

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Safety Precautions

WARNING: *Personal computers operate with voltages that can be lethal. Before removing the cover, follow these steps to protect yourself and the PC.*

1. **Turn off the PC and unplug it.**
2. **Remove jewelry from your hands and wrists.**
3. **Use insulated or nonconductive tools.**

Inspecting the 3C319 NIC

The contents of the 3C319 NIC package follow. If items are missing, contact your authorized network supplier immediately.

- TokenLink Velocity 16-bit ISA 3C319 NIC
- *TokenDisk* diskettes #1 and #2
- *TokenLink Velocity ISA Network Interface Card User Guide*

CAUTION: *The NIC is packed in an antistatic container to protect it during shipment. To avoid damaging highly static-sensitive components on the NIC or in the PC, reduce static electricity on your body by wearing an electrostatic discharge wrist strap attached to the chassis or by touching the chassis before handling the NIC.*

1. **Remove the 3C319 NIC from its box and set it on a nonstatic surface.**
2. **Return all packing materials to the shipping container.**

   If it is necessary to return the 3C319 NIC to 3Com, pack it in the original (or equivalent) packing material to maintain the warranty.

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3 **Remove the 3C319 NIC from its antistatic container.**

4 **Inspect the 3C319 NIC for visible signs of damage.**

If you find a problem, immediately notify your authorized network supplier and the carrier that delivered the NIC.

Complete the Product Registration Card and return it to 3Com. Or call 1-800-NET-3Com for immediate registration.

Inserting the 3C319 NIC

Follow these steps to insert the 3C319 NIC:

1 **Insert the 3C319 NIC in an empty ISA or EISA expansion slot.**

Make sure it is completely seated in the slot by pushing down firmly on both ends of the NIC.

2 **Connect one of the following network cable types to the 3C319 NIC:**

- Shielded twisted-pair (STP) cable with a DB-9 connector
- Unshielded twisted-pair (UTP) cable with an RJ-45 connector

CAUTION: *Connect the cable only to the 3C319 NIC that you have just installed. Connecting the cable to other NICs could cause serious damage to them and the token ring network.*

TokenLink Velocity NICs support industry-standard token ring Category 3, 4 or 5 UTP or types 1 or 6 STP cabling. These cables meet IEEE 802.5 specifications.

Do not daisy-chain token ring NICs or connect them back to back.

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3 **Connect the other end of the cable to a network dual access unit (DAU), a multistation access unit (MAU), controlled access unit (CAU), or a token ring switch.**

The 3C319 NIC can operate in full-duplex mode when attached to a Dedicated Token Ring (DTR)-enabled switch.

4 **Plug in the PC and turn the power on.**

The next step is to verify that the PC operating system recognizes the 3C319 NIC as a new device and configures it. If the operating system cannot automatically configure the NIC, you must configure it manually.

Before Configuring the NIC and Installing the Driver

After you have installed the 3C319 NIC in your PC, the next step is to configure the NIC and install the network driver for your environment.

For some operating systems, NIC configuration and driver installation are automatic; for others, you need to manually configure the NIC before installing the driver.

Most PCs produced after 1995 include Plug and Play (PnP) capabilities. When you turn on the computer after installing the NIC, PnP assigns settings to the following resources:

- I/O base address
- Interrupt request level
- BIOS/MMIO base address
- Shared RAM address

The configuration parameters are set initially by 3Com. Table 2-1 lists the default settings of the 3C319 NIC at shipment.

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Table 2-1 Initial Settings of Configuration Options

Option	Default Settings in PCs with PnP Support	Default Settings in PCs without PnP Support
Plug and Play	Enabled	Enabled
Configuration Mode	3Com	3Com
I/O Base Address	Set by PnP	A20h
Interrupt Request Level	Set by PnP	2(9)
Ring Speed	16 Mbps	16 Mbps
BIOS/MMIO Base Address	Set by PnP	CC000
RAM Page Size	16 K	16 K
Shared RAM Address Range	Set by PnP	D8000–DBFFF
Memory Mode	16-bit	16-bit
I/O Mode	16-bit	16-bit
IRQ Driver Type	Edge Triggered	Edge Triggered
AutoSwitch	Disabled	Disabled
Boot PROM	Disabled	Disabled
Zero Wait State	Enabled	Enabled

If you require other settings, you must change them manually, as described in Chapter 5, "Configuring the NIC Manually," and then reboot.

If your PnP PC does not detect and automatically configure the 3Com NIC, do not assume the NIC is defective. The BIOS PnP may be an early design, or the design may be nonstandard. Use the procedures in Chapter 5, "Configuring the NIC Manually," to disable PnP and configure the NIC.

Proceed with NIC configuration and driver installation according to the conditions described below:

- If you have a single 3C319 NIC installed and want to load a single NetWare DOS ODI client, see Chapter 3, "Installing NetWare DOS Clients Automatically." Chapter 3 describes using the 3Com AutoLink utility to configure the NIC automatically and install the DOS 16-bit client network driver for NetWare 3.12 and 4.10 systems.

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- If you installed the 3C319 NIC in a PC running Windows 95 with PnP, it will be configured automatically when you install the driver. See Chapter 4, "Installing a Network Driver for Windows 95."

  After installing the NDIS 4 driver for Windows 95, you have the option to enable DynamicAccess Class of Service support for the 3C319 NIC. See Chapter 7, "Configuring DynamicAccess Class of Service."

- If you installed the 3C319 NIC in a PC running Windows NT, disable PnP before installing the driver. See Chapter 5, "Configuring the NIC Manually," for instructions on disabling PnP. For Windows NT driver installation instructions, see Chapter 6, "Installing a Network Driver for Windows NT."

  After installing the NDIS 4 driver for Windows NT, you have the option to enable DynamicAccess Class of Service support for the 3C319 NIC. See Chapter 7, "Configuring DynamicAccess Class of Service."

- If you installed the 3C319 NIC in a PC running Windows for Workgroups with PnP, disable PnP before installing the driver. See Chapter 5, "Configuring the NIC Manually," for instructions on disabling PnP. For Windows for Workgroups driver installation information, see "Installing a Driver for Windows for Workgroups" in Chapter 8.

- If you installed the 3C319 NIC in a PC without PnP, or installed the NIC in a PC with a BIOS that does not have a utility to recognize and configure PnP-enabled devices, you must manually configure the NIC before installing the driver. See Chapter 5, "Configuring the NIC Manually," and then see Chapter 8, "Manually Installing Miscellaneous Network Drivers."

Table 2-2 summarizes the installation procedures for supported network environments.

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Table 2-2 Installation Procedures for Supported Network Environments

Step	NetWare DOS Client	Windows 95	Windows NT	Others
1	Run AutoLink. See Chapter 3, "Installing NetWare DOS Clients Automatically."	Install driver. See Chapter 4, "Installing a Network Driver for Windows 95."	Boot DOS, disable PnP, and configure NIC. See Chapter 5, "Configuring the NIC Manually."	Boot DOS, disable PnP, and configure NIC. See Chapter 5, "Configuring the NIC Manually."
2		Configure DynamicAccess Class of Service. See Chapter 7, "Configuring DynamicAccess Class of Service."	Install driver. See Chapter 6, "Installing a Network Driver for Windows NT."	Install driver. See Chapter 8, "Manually Installing Miscellaneous Network Drivers."
3			Configure DynamicAccess Class of Service. See Chapter 7, "Configuring DynamicAccess Class of Service."	

If you encounter problems during any step of the installation process, turn to Chapter 9, "Troubleshooting NIC Installation," for help.

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3 INSTALLING NETWARE DOS CLIENTS AUTOMATICALLY

The 3Com AutoLink software utility automatically configures one 3C319 NIC and installs the DOS 16-bit ODI client network driver for NetWare 3.12 and 4.10 systems. This chapter describes running the AutoLink program. Disregard this chapter if you do not want to install the DOS 16-bit client driver for NetWare.

AutoLink Software Functions

AutoLink software configures your PC as a NetWare DOS ODI client. The AutoLink configuration program performs the following functions:

- Configures a single 3C319 NIC.

The AutoLink configuration utility cannot be used to configure multiple 3C319 NICs.

- Installs the NetWare client software from *TokenDisk* diskette #1.
- Modifies the CONFIG.SYS, AUTOEXEC.BAT, and NET.CFG files. (The previous versions of these files are renamed CONFIG.3CM, AUTOEXEC.3CM, and NET.3CM.)

The AutoLink configuration utility is a DOS application. It cannot run in PCs running OS/2, Windows 95, or Windows NT.

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Before Using the AutoLink Configuration Utility

Make sure that the following steps have been performed before using the AutoLink configuration utility:

- The NIC is installed in your DOS-based PC and is connected to the network.
- NetWare version 3.12 or later is installed on the server (if necessary).
- A NetWare server account is available with a user ID and password.
- DOS version 3.2 or later is installed on the client PC.

Modifying AutoLink Default Settings

A 3INSTALL.BAT file in the LOGIN directory of the NetWare server allows the AutoLink configuration program to download the NetWare client software from the server instead of from *TokenDisk* diskette #1. Your system administrator can create a 3INSTALL.BAT file that copies specific software from the server to customize your installation.

Use the AUTOLINK.CFG file to modify the AutoLink configuration process. The AUTOLINK.CFG file in the AUTOLINK directory on *TokenDisk* diskette #1 contains default settings and descriptions of the AUTOLINK.CFG parameters.

Avoiding Memory Manager Conflicts

The NIC uses areas of upper memory to transfer data. If you are using a memory manager such as EMM386 on your PC, you must reserve the upper memory for the NIC. The 3C319 NIC's default configuration requires 16 K of shared RAM at address D8000–DBFFF and 8 K of MMIO/BIOS address at CC000. The following example uses EMM386 and the default memory range.

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1 **Make a backup copy of the CONFIG.SYS file. Type:**

```
copy config.sys config.old [Enter]
```

2 **Edit the memory manager device statement in the CONFIG.SYS file to exclude the memory range that the 3C319 NIC uses.**

The statement should be similar to the following:

```
DEVICE=C:\WINDOWS\EMM386.EXE NOEMS X=CC00-CDFF X=D800-DBFF
```

where *X* stands for exclude, followed by the NIC's memory range. See Chapter 5, "Configuring the NIC Manually," for additional memory ranges.

Refer to your operating system manual for additional instructions and information on using the memory manager.

3 **Save the CONFIG.SYS file and exit the text editor.**

4 **Reboot the PC.**

Next, load the NetWare DOS ODI client driver by running the AutoLink program, as described in the next section.

Running the AutoLink Program

The AutoLink program loads the NetWare DOS ODI client driver and automatically configures the 3C319 NIC. To run the AutoLink program, follow these steps:

1 **Insert *TokenDisk* diskette #1 in the floppy drive and type:**

```
a: [Enter]
```

2 **Type:**

```
autolink [Enter]
```

The first time you use the installation software, the 3Com software license appears.

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3 **To accept the terms and conditions, type:**

y

To view the full text of the license agreement, press [F1].

4 **When the information screen appears, press [Enter] to continue.**

A status message appears, followed by a prompt for the ring speed of your network.

5 **Enter the ring speed and configuration mode and press [Enter].**

The default ring speed is 16 Mbps. The 3C319 NIC operates at either 16 or 4 Mbps. The speed of the NIC and the network must be the same. Ask your system administrator for your network ring speed. See Chapter 5, "Configuring the NIC Manually," for details.

The configuration mode choices are 3Com or IBM mode. The default configuration mode is 3Com mode. See Chapter 5, "Configuring the NIC Manually," for details.

A message states that the NIC's configuration is complete.

6 **Remove *TokenDisk* diskette #1 and press any key to reboot your PC.**

The login prompt for a NetWare server appears.

7 **Log in to the NetWare server with your ID and password.**

Your PC is now configured as a NetWare DOS ODI client. If you cannot connect to the NetWare server, see Chapter 9, "Troubleshooting NIC Installation."

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4 Installing a Network Driver for Windows 95

This chapter describes how to install the NDIS 4 driver for the TokenLink Velocity ISA (3C319) NIC in Windows 95 environments. The NDIS 4 driver conforms to Microsoft's latest NDIS 4.0 miniport specification and provides the following features:

- DynamicAccess Class of Service
- Auto ring speed detection
- Promiscuous mode

The 3C319 NIC NDIS 3 full MAC driver, which is compatible with Microsoft's earlier NDIS 3.x specification, is available on *TokenDisk* diskette #1 in the \WIN95 subdirectory. However, the features listed above are available only with the NDIS 4 driver.

Explicit instructions for installing the NDIS 3 driver are no longer provided in this guide because that driver has been superseded by the NDIS 4 driver, which provides additional features such as DynamicAccess Class of Service.

If you still want to load the NDIS 3 driver, follow the instructions provided in this guide for the NDIS 4 driver. When directed to insert TokenDisk diskette #2 (containing the NDIS 4 driver), you should instead insert TokenDisk diskette #1, which contains the NDIS 3 driver. In all other respects, the instructions for installing the NDIS 4 driver and NDIS 3 driver are nearly identical.

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Before Installing the Driver

Before you install the NDIS 4 driver, make sure that the 3C319 NIC is installed as described in Chapter 2, and that Windows 95 is installed.

Have the Windows 95 software accessible on diskettes, CD, or hard drive in case the installation utility requests protocol files from the Windows 95 software library.

If your network environment uses the TCP/IP communications protocol, you must obtain from your network administrator all the information you will need to define an IP address during the installation process.

Installing the NDIS 4 Driver for Windows 95

This section describes installing the 3C319 NIC NDIS 4 driver for the following Microsoft Windows 95 versions:

- Retail version 950 (950a)
- OEM Service Release 2 (OSR2) version 950b

The default installation modes are 16 Mbps ring speed and 3Com mode. If these options are not satisfactory, you can change the settings in Windows 95.

About Microsoft Windows 95 Versions

The 3C319 NIC NDIS 4 driver installation procedures differ depending on the Windows 95 version installed on your PC.

Retail Version of Windows 95

If your PC did not come with Windows 95 already installed, you must install the retail version of Windows 95 (version 950) before you load the driver. The retail version of Windows 95 is designed to upgrade Windows 3.x PCs.

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OSR2 Version of Windows 95

Some PCs are sold with a special Windows 95 version already installed. Windows 95 OEM Service Release 2 (OSR2) is version 950b of Windows 95. An OEM Service Release is an updated version of a Microsoft product for PC original equipment manufacturers (OEMs) to preinstall on new PCs. The OSR2 version of Windows 95 contains some new hardware support and programs.

Finding the Windows 95 Version

To determine which Windows 95 version you are using, open the Control Panel, select *System*, and read the System information under the General tab. If your release is version 4.00.950 (or 4.00.950a), you are using the retail version of Windows 95 (version 950). If your release is version 4.00.950b, you are using the OSR2 version of Windows 95 (version 950b).

Installing the NDIS 4 Driver for Retail Windows 95

This section describes two ways to install the NDIS 4 driver for retail Windows 95 (version 950), depending on whether or not your PC supports PnP configuration. If you are not sure whether your Windows 95 version has PnP support, first try the following procedure, "When Windows 95 PnP Detects the NIC." If your PC does not automatically detect the 3C319 NIC after you turn on power to the PC, use the second procedure, "When Windows 95 Does Not Detect the NIC."

When Windows 95 PnP Detects the NIC

Follow these steps to install the NDIS 4 driver for Windows 95 with PnP support. It is assumed that you are already running Windows 95.

1 Turn on the computer and start Windows 95.

Windows 95 automatically detects the new hardware in the PC. Windows 95 displays the New Hardware Found window.

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2 **Select *Driver from disk provided by hardware manufacturer* and click *OK*.**

Windows 95 displays the Install from Disk dialog box, which prompts you to insert the appropriate diskette and to type the directory location for the NDIS 4 driver.

3 **Insert *TokenDisk* diskette #2 in the floppy drive.**

4 **Type the following path at the prompt:**

a:

5 **Click *OK*.**

If Windows 95 prompts you to insert the Windows 95 CD or diskettes to obtain files from the Windows 95 software library, insert the appropriate media and continue as directed by the prompts.

6 **When the setup file has been read, select *TokenLink Velocity ISA NIC* on the list and click *OK*.**

Windows 95 imports the driver, and the driver installation is complete.

Auto ring speed detection is automatically enabled when you install the NDIS 4 driver for Windows 95. If you want to disable auto ring speed detection, see "Auto Ring Speed Detection" in Chapter 7.

The DynamicAccess Class of Service feature is disabled by default when you install the NDIS 4 driver for Windows 95. To activate Class of Service, see Chapter 7, "Configuring DynamicAccess Class of Service".

When Windows 95 Does Not Detect the NIC

Follow these instructions to install the NDIS 4 driver for Windows 95 if your PC does not support PnP hardware configuration or does not detect the 3C319 NIC.

If your Windows 95 version has PnP support but is still not able to detect the 3C319 NIC, you should disable PnP before proceeding, as described in Chapter 5, "Configuring the NIC Manually". Once you have disabled PnP, follow these steps to install the NDIS 4 driver:

1 **In the Windows 95 desktop, double-click the *My Computer* icon.**

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2 **In the My Computer group, double-click the *Control Panel* icon.**

3 **In the Control Panel group, double-click the *Network* icon.**

4 **In the Network dialog box, click *Add*.**

5 **In the Select Network Component Type dialog box, double-click *Adapter*.**

6 **In the Select Network Adapters dialog box, click *Have Disk*.**

7 **Insert *TokenDisk* diskette #2 in the floppy drive.**

8 **In the Copy Manufacturer's Files From selection box, type:**

```
a:\
```

9 **Click *OK*.**

10 **In the Models selection box, select the correct mode (either ISA or EISA).**

- Select *3Com TokenLink Velocity ISA 3C319* if you installed the NIC in an ISA slot. You can also make this selection if the NIC is in an EISA slot as long as you have not enabled the AutoSwitch option. (For more information about enabling the AutoSwitch option, see instructions in the section "Other Configuration Options" in Chapter 5.)
- Select *3Com TokenLink Velocity ISA 3C319 in EISA mode* only if you installed the NIC in an EISA slot and used the EISA configuration utility to configure the NIC.

In a Compaq EISA-based PC, with PnP enabled on the NIC, you are asked to run the EISA configuration utility. Refer to the instructions that accompanied the PC for details.

11 **Click *OK*.**

12 **In the Network dialog box, click *OK*.**

13 **On the Resources screen, click *OK* to accept the I/O base address.**

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14 **Remove *TokenDisk* diskette #2 from the floppy drive.**

15 **Click *Yes* to restart your PC to activate the driver.**

This concludes the procedure for installing the NDIS 4 driver for retail Windows 95 without PnP support.

Auto ring speed detection is automatically enabled when you install the NDIS 4 driver for Windows 95. If you want to disable auto ring speed detection, see "Auto Ring Speed Detection" in Chapter 7.

The DynamicAccess Class of Service feature is disabled by default when you install the NDIS 4 driver for Windows 95. To activate Class of Service, see Chapter 7, "Configuring DynamicAccess Class of Service".

Installing the NDIS 4 Driver for Windows 95 OSR2

Follow these steps to install the driver for Windows 95 OEM Service Release 2 (OSR2) version 950b. It is assumed that you are already running Windows 95.

During installation, have the Windows 95 software accessible on diskettes, CD, or hard drive in case the installation utility requests files from the Windows 95 software library.

1 **Install the 3C319 NIC and start the computer.**

Windows 95 detects the new hardware. *ISA Token Ring Controller* appears in the New Hardware Found dialog notice. The Update Device Driver Wizard dialog box appears.

2 **Click *Next*.**

3 **Click *Other Locations*.**

The Select Other Locations dialog box appears.

4 **Insert *TokenDisk* diskette #2 in the floppy drive.**

5 **Type the following path and click *OK*:**

a:

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6 Verify that the Update Device Driver Wizard dialog box lists *3Com TokenLink Velocity ISA Adapter*, and click *Finish*.

Messages appear while files are being copied. The System Settings Change dialog box appears.

7 Remove *TokenDisk* diskette #2 from the floppy drive.

8 Click *Yes* to restart the computer.

This concludes the procedure for installing the NDIS 4 driver for Windows 95 under OSR2.

Auto ring speed detection is automatically enabled when you install the NDIS 4 driver for Windows 95. If you want to disable auto ring speed detection, see "Auto Ring Speed Detection" in Chapter 7.

The DynamicAccess Class of Service feature is disabled by default when you install the NDIS 4 driver for Windows 95. To activate Class of Service, see Chapter 7, "Configuring DynamicAccess Class of Service".

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5 CONFIGURING THE NIC MANUALLY

This chapter describes how to configure the 3C319 NIC manually using the Configuration and Diagnostic Program on *TokenDisk* diskette #1. Use the procedures in this chapter if:

- Your PC does not provide PnP configuration; the BIOS does not have a utility that recognizes and configures PnP-enabled devices
- The PnP utility on your PC does not detect and configure the 3C319 NIC
- Your network operating system does not support PnP configuration
- You need to reconfigure a parameter not set by the PnP BIOS
- You need to disable PnP for the 3C319 NIC
- You have a system failure while using the Configuration and Diagnostic Program

Change the default configuration for the NIC only if you have conflicts with other devices or cards. (See Table 2-1 for initial settings set by 3Com for configuration options.) For standard settings of commonly used devices, refer to the SYSRESRC.TXT file in the HELP directory on *TokenDisk* diskette #1.

This chapter does not apply to 3C319 NICs installed in EISA PCs with the AutoSwitch option enabled. To change software option settings in an EISA PC, use the EISA configuration utility provided with the PC.

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Before Using the Configuration and Diagnostic Program

To configure the 3C319 NIC, the NIC must be already installed in your PC and connected to the network, as described in Chapter 2.

The Configuration and Diagnostic Program is a DOS application that will not function properly if the 3C319 drivers are already installed.

The Configuration and Diagnostic Program indicates memory conflicts if you run it with a memory manager without excluding the memory range used by the 3C319 NIC. Before you run the Configuration and Diagnostic Program, you must bypass the drivers and the /memory manager. Use a DOS diskette if you are running DOS 5.0 or earlier.

If you are running Windows NT, perform a clean boot from the DOS partition, or boot from a DOS diskette to run the diagnostic program. If you use Windows 95 or Windows for Workgroups, exit Windows and restart the PC in MS-DOS mode, or boot from a floppy that has the operating system installed on it.

Configuring the 3C319 NIC in a PC Without PnP Support

Before starting, make sure that you have performed a clean DOS boot according to the instructions in the preceding section, "Before Using the Configuration and Diagnostic Program." To configure the 3C319 NIC in a PC without PnP support, follow these steps:

1 **Insert *TokenDisk* diskette #1 in a floppy drive (for example, the A drive) on your PC, and at the DOS prompt type:**

```
a: [Enter]
```

2 **At the prompt, type:**

```
install [Enter]
```

The first time you use the installation software, a software license screen appears.

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3 To accept the displayed terms and conditions, type:

y

To view the full text of the license agreement, press [F1].

The main menu appears, as shown in Figure 5-1.

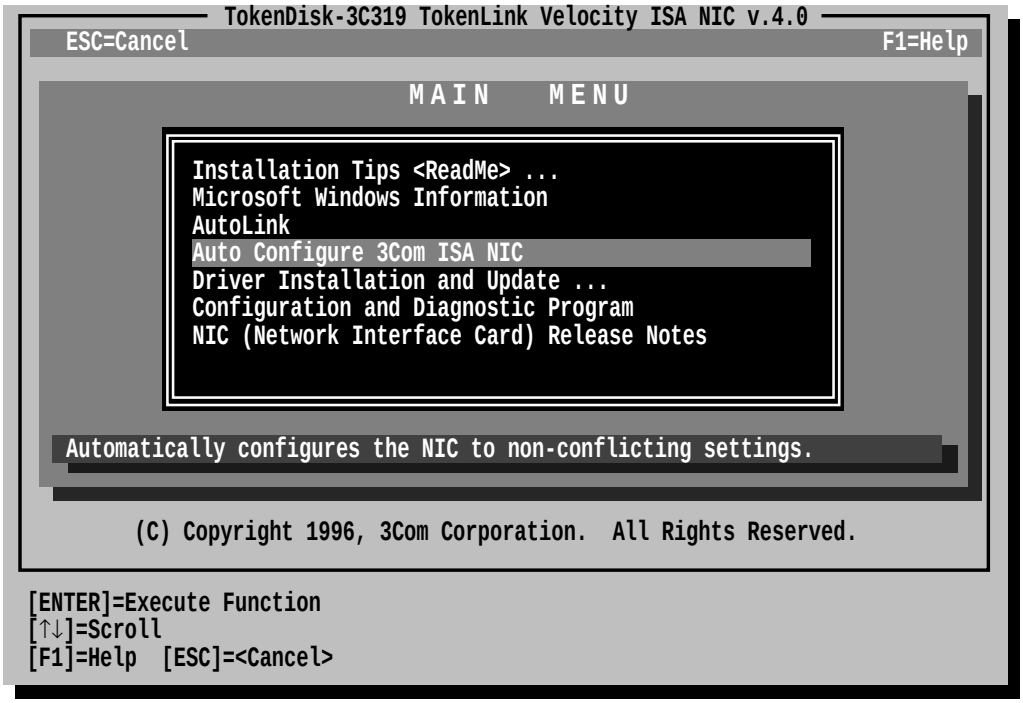

Figure 5-1 Main Menu

4 Use the arrow keys to select *Auto Configure 3Com ISA NIC*. Press [Enter].

5 Select the operating mode and speed:

- 3Com mode, 16 Mbps
- 3Com mode, 4 Mbps
- IBM mode, 16 Mbps
- IBM mode, 4 Mbps

3Com mode provides significant throughput performance improvements, the same features as IBM mode, and additional I/O address options and interrupt request (IRQ) levels that reduce the possibility of conflicts with other peripherals.

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IBM mode is compatible with existing IBM drivers. Table 5-1 shows the differences between the modes.

Table 5-1 3Com Mode Versus IBM Mode

3Com Mode	IBM Mode
Requires 3Com drivers for expanded configuration settings. Supports existing IBM Token Ring 16/4 Adapter drivers when the I/O base address = A20 or A24 and the IRQ = 2, 3, 6, or 7.	Supports existing IBM Token Ring 16/4 Adapter drivers
Parallel Tasking architecture	
Maximum of 6 NICs in one PC	Maximum of 2 NICs in one PC
8 IRQ levels	4 IRQ levels
31 I/O base addresses	2 I/O base addresses (A20h, A24h)

6 Press [Enter].

After you have selected the configuration mode and ring speed, the configuration program automatically attempts to configure device parameters to settings that do not conflict with other devices in your PC. The configuration program displays settings for the following parameters:

- Configuration mode
- I/O base address
- Interrupt request level
- Ring speed
- BIOS/MMIO base address
- Shared RAM address range

To change the settings manually, follow the steps in the next section, "Changing Configuration Option Settings."

7 Press any key to continue.

The configuration program returns you to the main menu (Figure 5-1).

8 Press [Esc] to exit the Configuration and Diagnostic Program.

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Changing Configuration Option Settings

PnP is enabled by default. You must disable PnP to configure the 3C319 NIC with the Configuration and Diagnostic Program.

To disable PnP for the 3C319 NIC and change the configuration settings, follow these steps:

1. **Insert *TokenDisk* diskette #1 in the floppy drive (for example, the A drive) and type:**

   `a:\3trdiag [Enter]`

2. **Select *Install* and press [Enter].**

3. **Press [Enter] to select *Configure NIC*.**

   The screen shown in Figure 5-2 appears.

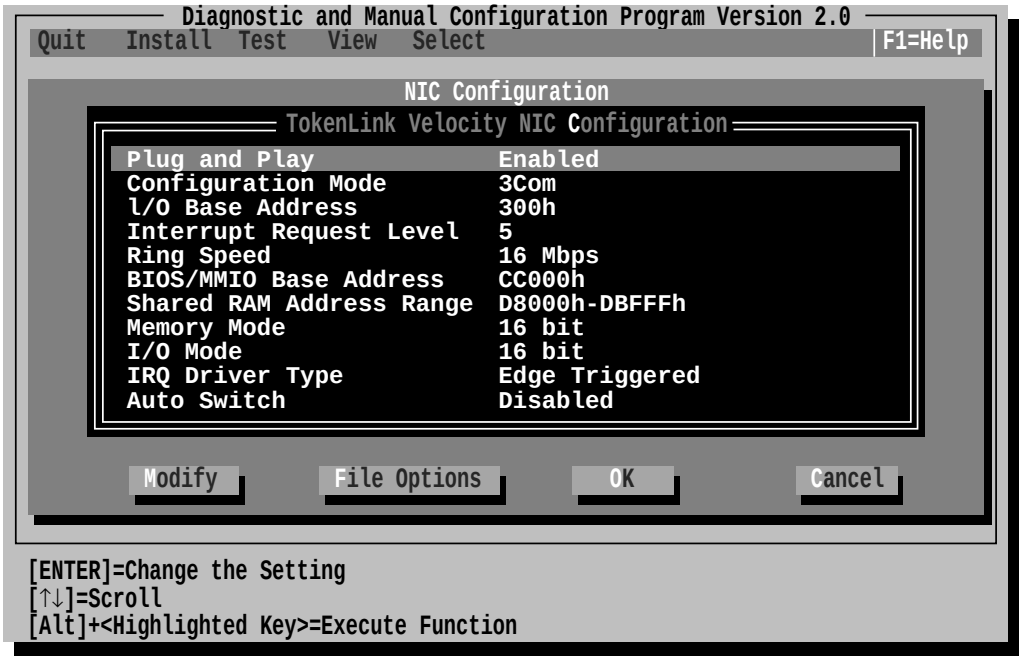

Figure 5-2 NIC Configuration Screen

4. **If Plug and Play is enabled, use the arrow keys to select *Plug and Play* and press [Enter] to disable it.**

5. **Use the arrow keys to select another parameter and press [Enter].**

   A second dialog box appears to allow you to make your choice.

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6 **If you want to change other configuration option settings, use the arrow keys to select a setting and press [Enter].**

You can use a mouse, provided a mouse driver is installed on your PC. In this case, click the setting you want.

7 **Continue this procedure to select other options.**

8 **Press [Tab] until you highlight *OK*.**

9 **Press [Enter].**

This procedure saves the new settings to the NIC.

After manually configuring the 3C319 NIC, you must install network drivers. If you have disabled PnP and manually configured the NIC for your Windows 95 environment, go to Chapter 4, "Installing a Network Driver for Windows 95." For Windows NT environments, go to Chapter 6, "Installing a Network Driver for Windows NT." For information on manually installing drivers for other operating systems, see Chapter 8, "Manually Installing Miscellaneous Network Drivers."

Changing the Configuration of Multiple NICs

If you have more than one 3C319 NIC in a PC, you must configure each one separately. Go to the main window of the Configuration and Diagnostic Program, press [F10], and select the next NIC. Repeat steps 4 through 9 in the section "Changing Configuration Option Settings."

Configuration Options

This section discusses the configuration options for the 3C319 NIC. For instructions on changing any of these options, see the section "Changing Configuration Option Settings" earlier in this chapter. The following configuration options are available:

- Plug and Play (PnP)
- Configuration Mode
- Ring Speed

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- I/O Base Address
- BIOS/MMIO Address Location
- Shared RAM Page Size and Address Range
- Interrupt Request Level
- Memory Mode
- I/O Mode
- IRQ Driver Type
- AutoSwitch
- Boot PROM
- Zero Wait State

Plug and Play (PnP)

This option enables a PC with Plug and Play (PnP) support to allocate resources for the 3C319 NIC. The resources allocated in a PnP system include:

- I/O base address
- Interrupt request level
- BIOS/MMIO base address
- Shared RAM base address

The default for PnP is enabled. Disable PnP to configure the 3C319 NIC with the Configuration and Diagnostic Program. For instructions, see the section "Changing Configuration Option Settings" earlier in this chapter.

Configuration Mode

This 3C319 NIC provides the following two modes of operation:

- 3Com mode
- IBM mode

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3Com mode increases the number of available IRQ channels from 4 to 8 and the number of I/O base addresses from 2 to 31. You can install up to six 3C319 NICs per PC. 3Com drivers are supplied on the *TokenDisk* diskettes to support these 3Com mode enhancements. The default is 3Com mode.

IBM mode provides the same configuration options as IBM 16/4 Token Ring Adapters: 4 IRQ channels and 2 I/O base addresses. You can continue to use IBM drivers with the NIC in IBM mode.

Ring Speed

The 3C319 NIC operates at a ring speed of either 4 or 16 Mbps. The 3C319 NIC ring speed must match the speed of the token ring network. The default value is 16 Mbps. For the NDIS 4 driver, the auto ring speed detection feature is enabled by default. (To disable the auto ring speed detection feature, see "Auto Ring Speed Detection" in Chapter 7.)

I/O Base Address

In IBM mode when only one 3C319 NIC is installed, it is designated the Primary NIC. Change the Primary/Alternate option with the Configuration and Diagnostic Program. The base address allowed in IBM mode is A20h (primary) or A24h (alternate). The default is A20h.

In 3Com mode the I/O base addresses designate the NICs. The I/O base addresses for 3Com mode are as follows, with the default address in **bold**:

A20h	280h	300h	380h
A24h	290h	310h	390h
210h	2A0h	320h	3A0h
220h	2B0h	330h	3B0h
230h	2C0h	340h	3C0h
240h	2D0h	350h	3D0h
250h	2E0h	360h	3E0h
260h	2F0h	370h	

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If a system resource conflict continues, you may have to change the settings of other NICs or options that are in your PC.

BIOS/MMIO Address Location

There are 12 possible 8 KB blocks of PC memory that can be assigned for accessing the ROM area of the 3C319 NIC. The factory default ROM address for the 3C319 NIC is CC000–CDFFF. The ROM address locations are as follows, with the default in **bold**:

C8000-C9FFF	D4000–D5FFF
CA000–CBFFF	D6000–D7FFF
CC000–CDFFF	D8000–D9FFF
CE000–CFFFF	DA000–DBFFF
D0000–D1FFF	DC000–DDFFF
D2000–D3FFF	DE000–DFFFF

The BIOS/MMIO address selected must not be assigned for use by any other NIC or device and cannot be the same as the RAM address for this NIC. If a system resource conflict exists, you may have to change the settings of other NICs or devices that are in your PC.

Shared RAM Page Size and Address Range

There are 22 possible blocks of memory available for accessing the RAM located on the 3C319 NIC. The factory default RAM size and address location for the 3C319 NIC, which support RAM paging, are 16 KB / D8000–DBFFF.

RAM paging allows the software to access all 64 KB of RAM on the 3C319 NIC one page (16 KB) at a time, while using only 16 KB of PC memory space. RAM paging is available for all 16 KB address ranges.

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If a conflict exists, you may have to change the settings of other NICs or adapters that are in your PC. The 22 RAM address ranges are as follows, with the default in **bold**:

8 KB / C8000–C9FFF	8 KB / DE000–DFFFF
8 KB / CA000–CBFFF	16 KB / C8000–CBFFF
8 KB / CC000–CDFFF	16 KB / CC000–CFFFF
8 KB / CE000–CFFFF	16 KB / D0000–D3FFF
8 KB / D0000–D1FFF	16 KB / D4000–D7FFF
8 KB / D2000–D3FFF	**16 KB / D8000–DBFFF**
8 KB / D4000–D5FFF	16 KB / DC000–DFFFF
8 KB / D6000–D7FFF	32 KB / C8000–CFFFF
8 KB / D8000–D9FFF	32 KB / D0000–D7FFF
8 KB / DA000–DBFFF	32 KB / D8000–DFFFF
8 KB / DC000–DDFFF	64 KB / D0000–DFFFF

Interrupt Request Level

A 3C319 NIC can operate on one of four interrupt levels for IBM mode (2 [9], 3, 6, or 7), or one of eight interrupt levels for 3Com mode (2 [9], 3, 5, 6, 7, 10, 11, or 15).

The default interrupt level is 2, but the 3C319 NIC can operate on any of the levels if necessary. If a conflict continues, you may have to change the setting of other NICs or devices that are in your PC.

Other Configuration Options

The Configuration and Diagnostic Program also allows the selection of the following additional parameters.

3Com recommends that you avoid changing these configuration settings.

Memory Mode —Allows operation with 8-bit or 16-bit memory interfaces. The default is 16-bit, but the 8-bit option is provided for backward compatibility with older PCs. The Parallel Tasking feature is disabled in 8-bit mode.

I/O Mode —Allows operation with 8-bit or 16-bit I/O interfaces. The default is 16-bit, but the 8-bit option is provided for backward compatibility with older PCs.

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IRQ Driver Type —Provides a choice of IRQ signal drivers to the ISA bus. The level-sensitive type relies on the motherboard circuitry for reliable operation and allows shared interrupts. Edge triggering is a more robust technique because it is independent of motherboard circuitry, but does not allow shared interrupts. The default is edge-triggered.

AutoSwitch —When enabled, allows installation of the 3C319 NIC in an EISA PC by the EISA configuration utility without running the 3TRDIAG program first. The default is disabled. Do not enable AutoSwitch if you installed the 3C319 NIC in an ISA PC.

Boot PROM —When enabled, allows the PC to boot from a server. The default is disabled.

Zero Wait State —When enabled, allows the PC to communicate with the 3C319 NIC more quickly. Some PCs may not operate correctly with this option enabled. The option can be disabled to solve this problem. The default is enabled.

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6 Installing a Network Driver for Windows NT

This chapter describes how to install the NDIS 4 driver for the TokenLink Velocity ISA (3C319) NIC in Windows NT environments. The NDIS 4 driver conforms to Microsoft's latest NDIS 4.0 miniport specification and provides the following features:

- DynamicAccess Class of Service
- Auto ring speed detection
- Promiscuous mode

The 3C319 NIC NDIS 3 full MAC driver, which is compatible with Microsoft's earlier NDIS 3.x specification, is available on *TokenDisk* diskette #1 in the \WINNT subdirectory. However, the features listed above are available only with the NDIS 4 driver.

Explicit instructions for installing the NDIS 3 driver are no longer provided in this guide because that driver has been superseded by the NDIS 4 driver, which provides additional features such as DynamicAccess Class of Service.

If you still want to load the NDIS 3 driver, follow the instructions provided in this guide for the NDIS 4 driver. When directed to insert TokenDisk diskette #2 (containing the NDIS 4 driver), you should instead insert TokenDisk diskette #1, which contains the NDIS 3 driver. In all other respects, the instructions for installing the NDIS 4 driver and NDIS 3 driver are nearly identical.

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Before Installing the Driver

Before installing the driver, make sure that Windows NT is installed and that the following procedures have been completed:

- The 3C319 NIC has been installed as described in Chapter 2.
- Plug and Play (PnP) has been manually disabled as described in Chapter 5, "Configuring the NIC Manually."

Windows NT versions 3.51 and 4.0 are not PnP-enabled.

- The NIC has been manually configured as described in Chapter 5, "Configuring the NIC Manually."

If your network environment uses the TCP/IP communications protocol, you must obtain from your network administrator all the information you will need to define an IP address during the installation process.

Installing the NDIS 4 Driver for Windows NT

This section describes installing the 3C319 NIC NDIS 4 driver for the following Microsoft Windows NT versions:

- Windows NT 3.51
- Windows NT 4.0

Windows NT 3.51

Follow these steps to install the NDIS 4 driver for Windows NT 3.51:

1. **Insert *TokenDisk* diskette #2 in the floppy drive.**
2. **In the Main group, double-click the *Control Panel* icon.**
3. **In the Control Panel group, double-click the *Network* icon.**
4. **In the Network Settings dialog box, click *Add Adapter*.**

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5 **In the Add Network Adapter dialog box, scroll to the bottom of the Network Adapter Card selection list. Select *<Other> Requires disk from manufacturer.***

6 **Click *Continue*.**

7 **Type the following path at the prompt:**

`a:\`

This path identifies the location of the NDIS 4 OEMSETUP.INF file for Windows NT 3.51.

8 **Click *OK* to select the NIC.**

The driver files are copied to the C: drive. A prompt appears, asking if you want to restart your computer.

9 **Remove the *TokenDisk* diskette and click *Restart now*.**

This completes the installation.

Auto ring speed detection is automatically enabled when you install the NDIS 4 driver for Windows NT. If you want to disable auto ring speed detection, see "Auto Ring Speed Detection" in Chapter 7.

The DynamicAccess Class of Service feature is disabled by default when you install the NDIS 4 driver for Windows NT. To activate Class of Service, see Chapter 7, "Configuring DynamicAccess Class of Service".

Windows NT 4.0

Follow these steps to install the 3Com NDIS 4 driver for Windows NT 4.0:

1 **In the My Computer group, double-click the *Control Panel* icon.**

2 **In the Control Panel group, double-click the *Network* icon.**

3 **In the Network dialog box, click the Adapters tab.**

4 **In the Adapters tab, click *Add*.**

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5 **In the Select Network Adapter dialog box, click *Have Disk*.**

The Insert Disk dialog box appears.

6 **Insert *TokenDisk* diskette #2 in the floppy drive.**

7 **Type the following path and click *OK*:**

a:

This path identifies the location of the NDIS 4 OEMSETUP.INF file for Windows NT 4.0.

The Select OEM Option dialog box appears.

8 **Select *3Com TokenLink Velocity ISA (3C319) Adapter* and click *OK*.**

9 **Verify that *3Com TokenLink Velocity ISA (3C319) Adapter* appears in the list in the Network Adapters tab and click *Close*.**

If your network environment uses the TCP/IP communications protocol, the Microsoft TCP/IP Properties dialog box will be displayed. You must obtain from your network administrator all the information you need to define an IP address during the installation process. Continue once you have defined the NIC to TCP/IP.

Bindings messages appear, followed by a prompt to restart the computer.

10 **Remove *TokenDisk* diskette #2 from the floppy drive.**

11 **Click *Yes* to restart the computer.**

This concludes the procedure for installing the NDIS 4 driver for Windows NT 4.0.

Auto ring speed detection is automatically enabled when you install the NDIS 4 driver for Windows NT. If you want to disable auto ring speed detection, see "Auto Ring Speed Detection" in Chapter 7.

The DynamicAccess Class of Service feature is disabled by default when you install the NDIS 4 driver for Windows NT. To activate Class of Service, see Chapter 7, "Configuring DynamicAccess Class of Service."

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7 CONFIGURING DYNAMICACCESS CLASS OF SERVICE

This chapter describes enabling and configuring DynamicAccess Class of Service support for Windows 95 and Windows NT.

The DynamicAccess Class of Service feature lets you select critical applications for high-priority network access. Class of Service prioritization allows stations running critical applications under Windows 95 or Windows NT to access network bandwidth before other stations. The NDIS 4 driver requests a priority token when the selected applications transmit data.

DynamicAccess Class of Service is only available with the 3C319 NIC NDIS 4 driver. This feature is not available with other 3C319 NIC drivers.

The DynamicAccess Class of Service feature is disabled by default; if you want to take advantage of this feature, you must manually enable it after installing the NDIS 4 driver.

Before Starting Configuration

The 3C319 NIC must be installed and configured before you configure DynamicAccess Class of Service. For installation instructions, see Chapter 2, "Installing the 3C319 NIC." If your operating system does not automatically detect and configure the NIC, you must configure the NIC manually. See Chapter 5, "Configuring the NIC Manually," for instructions.

The NDIS 4 driver must also be installed before you configure DynamicAccess Class of Service. For installation instructions, see Chapter 4, "Installing a Network Driver for Windows 95," or see Chapter 6, "Installing a Network Driver for Windows NT."

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Finally, you must also have installed the appropriate applications that you want to prioritize.

Activating Class of Service

To select Class of Service applications in a Windows 95 or Windows NT environment, follow these steps:

1 **In the Control Panel group, double-click the *Class of Service* icon.**

The Supported Applications tab of the 3Com Class of Service Setup screen appears, as shown in Figure 7-1.

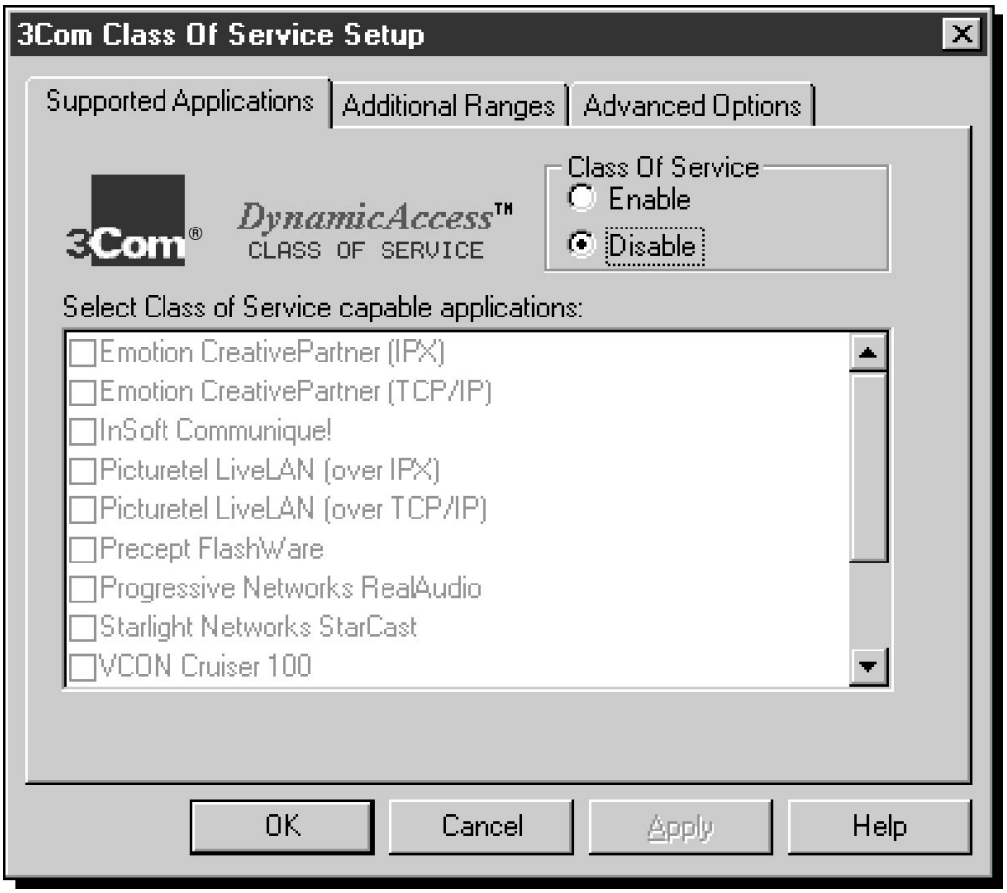

Figure 7-1 3Com Class of Service Setup Screen

2 **Click *Enable* in the Class of Service box.**

The default mode is *Disable*.

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3 Click the boxes next to the appropriate application names for which you want to activate Class of Service.

For the NDIS 4 driver to recognize high-priority network traffic, it must know if a stream of network traffic was generated by a given application.

If an application is not listed here, you can obtain the necessary information from the application's manufacturer and manually enter the information in the Additional Ranges tab.

4 Click *OK*.

Adding Class of Service Ranges and Protocols

You can add information for Class of Service applications that you want to prioritize but which are not listed on the 3Com Class of Service Setup screen (Figure 7-1).

You must specify port or socket ranges as well as the network protocol being used. Obtain the information from the application manufacturer. The Class of Service network driver uses these ranges to determine whether a packet should be treated as high-priority.

To add the Class of Service ranges and protocols, follow these steps:

1 Click the Additional Ranges tab.

The Class of Service Additional Ranges screen appears, as shown in Figure 7-2.

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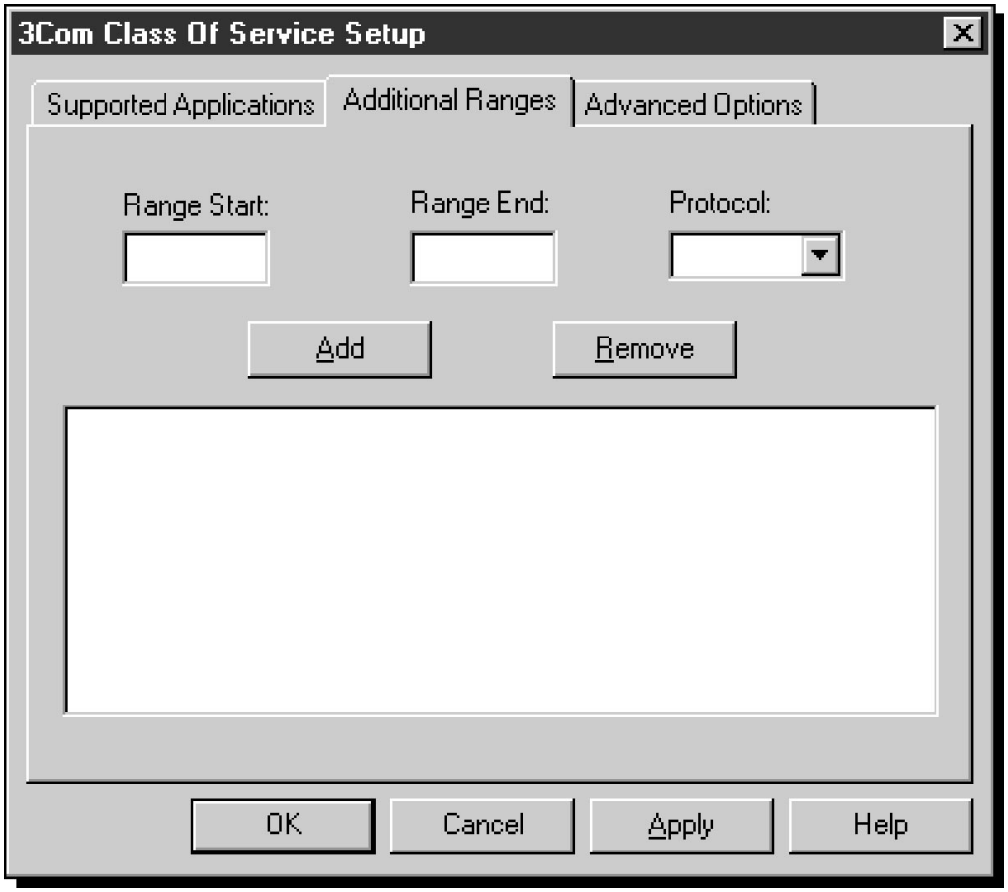

Figure 7-2 Initial Class of Service Additional Ranges Screen

2 Enter the beginning of the port or socket range for the application in the Range Start box.

The range start should be a hexadecimal value with a maximum of four digits.

3 Enter the inclusive range end value of the port or socket range for the application in the Range End box.

The range end should be a hexadecimal number with a maximum of four digits. If only one port or socket is needed, Range End should match Range Start.

4 Select the protocol that the application uses.

This can be TCP, UDP, or IPX. Some applications support multiple protocols and have port or socket ranges for each protocol. In this case, the range or protocol must match the protocol on the PC.

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For example, if only TCP/IP is installed, do not enter the socket range for IPX, as it will adversely affect driver performance.

5 **Once the Range Start, Range End, and Protocol are entered press *Add*.**

The range is added to the list, as shown in Figure 7-3.

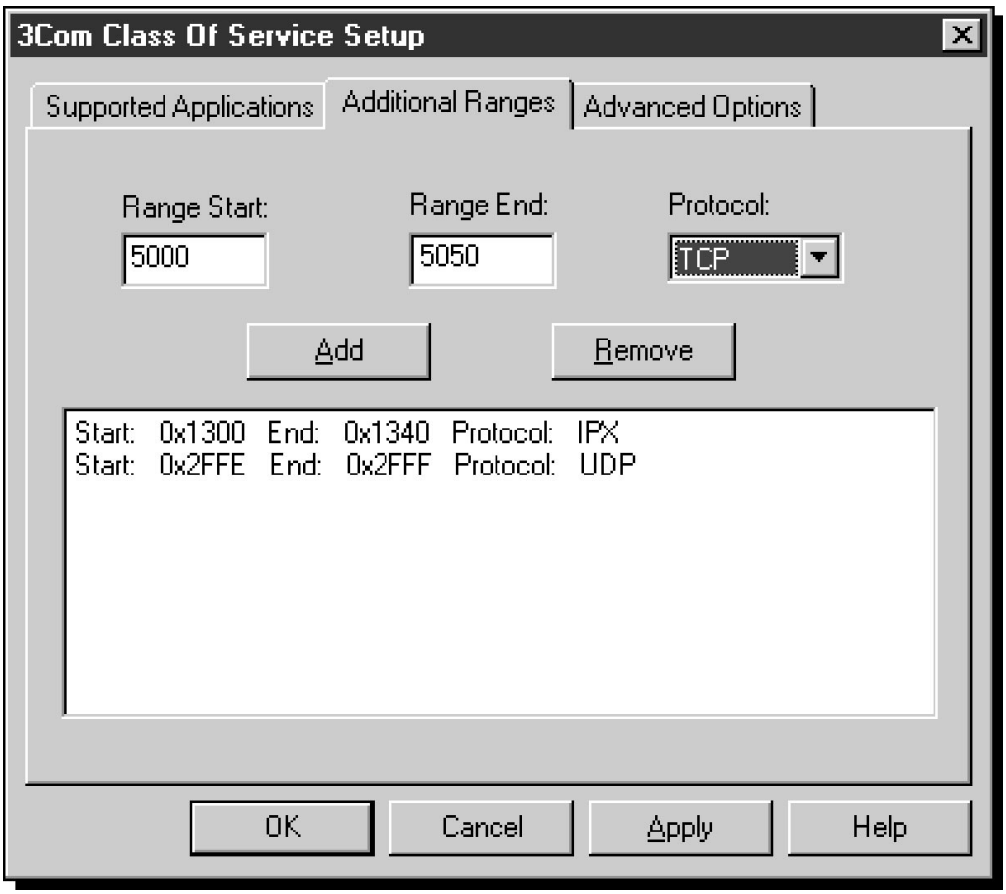

Figure 7-3 Class of Service Additional Ranges Screen with Added Ranges

6 **Click *OK* when you are finished.**

To remove a range, select the range in the list and click *Remove*.

Using Class of Service Advanced Options

You can use Class of Service Advanced Options to adjust the network driver's handling of certain types of Class of Service traffic. In general, you do not need to change these values. Contact your network administrator before using these options.

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Accessing Class of Service Advanced Options

To access the advanced options, follow these steps:

1 **To display the Class of Service Advanced Options screen, click the Advanced Options tab.**

The Class of Service Advanced Options screen appears, as shown in Figure 7-4.

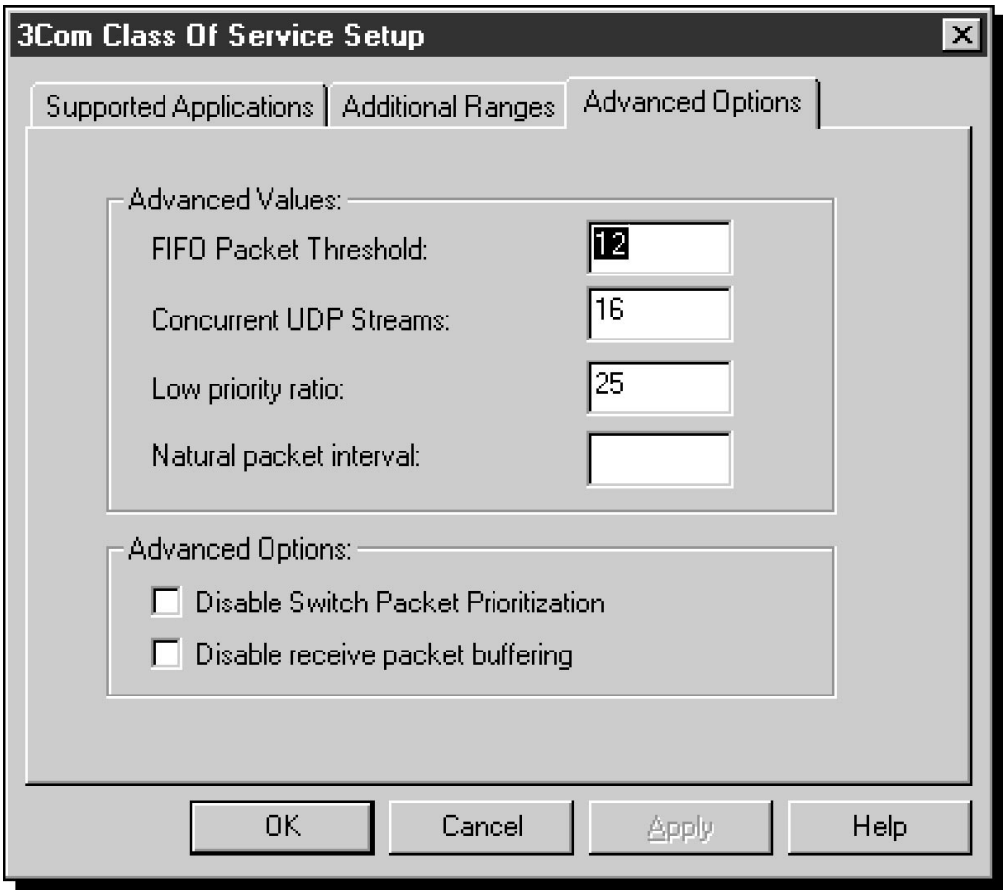

Figure 7-4 Class of Service Advanced Options Screen

2 **Enter new information as required.**

3 **Click *OK* to set the new value.**

4 **Reboot the system to activate changes.**

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Class of Service Advanced Options Settings

This section provides a detailed description of each Advanced Values field shown on the Class of Service Advanced Options screen (Figure 7-4).

The Advanced Options section of the Class of Service Advanced Options Screen shown in lower part of Figure 7-4 is not currently available for token ring installations.

FIFO Packet Threshold

This setting controls the number of non–Class of Service packets the network driver will allow in the FIFO ahead of any Class of Service packets. A smaller number decreases the time between Class of Service packets but can adversely affect performance. A value of 12 is recommended.

Concurrent UDP Streams

This option controls the number of simultaneous multimedia UDP packet streams the network driver can handle at any time. For many applications, the number of UDP streams is the same as the number of connections.

For example, for videoconferencing with three people, applications use three UDP streams for the video data. The value must be a power of two (2, 4, 8) but the optimal value may vary depending on the PC and application.

A video server may support 32 connections, but a client may only want to conference with four other people at a time.

A value of 16 is recommended for most applications.

Low-Priority Ratio

When Class of Service support is enabled, high-priority packets are always transmitted before low-priority packets. If a certain high-priority application sends out enough packets, no low-priority packets may be sent.

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To prevent this problem, the driver uses a ratio value to periodically send out a low-priority packet (if one is waiting to be sent).

For example, if a value of 1000 is entered, one low-priority packet would be sent for every 1000 high-priority packets. A value of 25 is recommended for most applications.

Natural Packet Interval

This field is not applicable for token ring installations. Any value entered in this field is ignored.

Disable Switch Packet Prioritization

This option is not currently enabled for token ring installations. Any setting is ignored.

Disable Receive Packet Buffering

This option is not currently enabled for token ring installations. Any setting is ignored.

Auto Ring Speed Detection

An alternative way to access DynamicAccess Class of Service is to click the *Properties* button with the 3C319 NIC selected while you are viewing the adapters list. Using this method also allows you to disable or enable the auto ring speed detection option.

The auto ring speed detection option permits the NDIS 4 driver for Windows 95 and Windows NT to detect and operate at the current ring data rate. Auto ring speed detection is automatically enabled when you load the NDIS 4 driver. (This feature is not available with other 3C319 NIC drivers.)

To manually set the ring speed after disabling auto ring speed detection, see "Changing Configuration Option Settings" in Chapter 5.

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The access paths for auto ring speed detection and DynamicAccess Class of Service through the *Properties* button are slightly different for Windows 95 and Windows NT. The following procedures describe the different paths.

Using Windows 95 to Access Auto Ring Speed Detection

To access the auto ring speed detection option in a Windows 95 environment, follow these steps:

1. **In the My Computer group, double-click the *Control Panel* icon.**
2. **In the Control Panel group, double-click the *System* icon.**
3. **In the System Properties dialog box, click the Device Manager tab.**
4. **In the Device Manager tab, double-click *Network adapters*.**
5. **Select *3Com TokenLink Velocity ISA (3C319) Adapter* and click *Properties*.**

   The 3Com TokenLink Velocity ISA (3C319) Adapter dialog box appears, as shown in Figure 7-5.

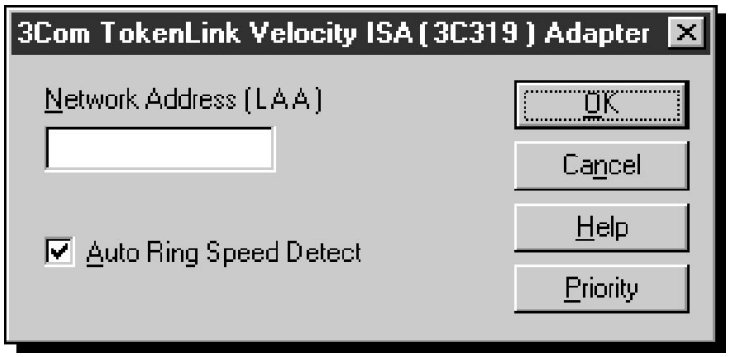

Figure 7-5 3Com TokenLink Velocity ISA Adapter Dialog Box

The 3Com TokenLink Velocity ISA (3C319) Adapter dialog box provides you with an alternative method of accessing DynamicAccess Class of Service. To access the 3Com Class of Service Setup screen (shown in Figure 7-1), click the *Priority* button.

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Using Windows NT to Access Auto Ring Speed Detection

To access the auto ring speed detection option and DynamicAccess Class of Service applications in a Windows NT environment, follow these steps:

1 **In the My Computer group, double-click the *Control Panel* icon.**

2 **In the Control Panel group, double-click the *Network* icon.**

3 **In the Network dialog box, click the Adapters tab.**

4 **In the Adapters tab, select *3Com TokenLink Velocity ISA (3C319) Adapter* and click *Properties*.**

The 3Com TokenLink Velocity ISA (3C319) Adapter dialog box appears, as shown in Figure 7-5.

The 3Com TokenLink Velocity ISA (3C319) Adapter dialog box provides you with an alternative method of accessing DynamicAccess Class of Service. To access the 3Com Class of Service Setup screen (shown in Figure 7-1), click the *Priority* button.

Disabling Auto Ring Speed Detection

The 3Com TokenLink Velocity ISA (3C319) Adapter dialog box (Figure 7-5) lets you disable or enable auto ring speed detection.

Auto ring speed detection is automatically enabled when you load the NDIS 4 driver. When enabled, the *Auto Ring Speed Detect* option is checked. To disable the option follow these steps:

1 **In the 3Com TokenLink Velocity ISA (3C319) Adapter dialog box (Figure 7-5), click the marked *Auto Ring Speed Detect* check box to clear it.**

The check box toggles between enabled (checked) and disabled (cleared).

2 **Click *OK*.**

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Setting a Locally Administered Network Address

The 3Com TokenLink Velocity ISA (3C319) Adapter dialog box (Figure 7-5) lets you manually set a locally administered address (LAA). In most cases, you use a preset NIC address and leave this field blank. Check with your network administrator before using this feature.

To set a locally administered address, follow these steps:

1 **With the 3Com TokenLink Velocity ISA (3C319) Adapter dialog box displayed (Figure 7-5), type a valid 12-digit address in the *Network Address (LAA)* field.**

   A valid 12-digit hexadecimal value falls within the following range (400000000000h to 7FFFFFFFFFFh)

2 **Click *OK*.**

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8 Manually Installing Miscellaneous Network Drivers

This chapter provides instructions for manually installing the following network software drivers:

- NetWare DOS ODI client driver
- NetWare server driver

If you followed the procedures in Chapter 3, "Installing NetWare DOS Clients Automatically," and the configuration was successful, you should not use the procedures in this chapter.

In addition, this chapter provides instructions for locating online installation information for the following network drivers:

- NetWare OS/2 ODI driver
- NDIS 2.01 driver
- Windows for Workgroups drivers

This chapter also provides information about obtaining and using IBM drivers, and about using Remote Program Load (RPL) to obtain boot images from various network operating system providers.

Examining Driver Files on the *TokenDisk* Diskettes

Two *TokenDisk* diskettes with network drivers are shipped with the 3C319 NIC. The following sections describe the contents of each diskette.

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TokenDisk Diskette #1 Contents

TokenDisk diskette #1 includes the following network drivers:

- NetWare DOS ODI driver (3CTOKEN.COM)
- NetWare OS/2 ODI driver (3CTOKEN.SYS)
- NetWare server driver (3CTOKEN.LAN)
- NDIS 2.01 DOS driver (TLNK3.DOS)
- NDIS 2.01 OS/2 driver (TLNK3.OS2)

  Use the NDIS 2.01 driver for the following network operating systems:

  - IBM LAN Server
  - Banyan VINES
  - DEC PATHWORKS
  - Artisoft LANtastic/AI
  - Microsoft LAN Manager
- NDIS 3.0 full MAC driver for Windows NT (TLNKV.SYS), Windows 95 (TLNKV.VXD), and Windows for Workgroups (TLNK3.386)

Explicit instructions for installing the NDIS 3 driver are no longer provided in this guide because that driver has been superseded by the NDIS 4 driver, which provides additional features such as DynamicAccess Class of Service.

If you still want to load the NDIS 3 driver, follow the instructions provided in this guide for the NDIS 4 driver. When directed to insert TokenDisk diskette #2 (containing the NDIS 4 driver), you should instead insert TokenDisk diskette #1, which contains the NDIS 3 driver. In all other respects, the instructions for installing the NDIS 4 driver and NDIS 3 driver are nearly identical.

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TokenDisk Diskette #2 Contents

TokenDisk diskette #2 contains the NDIS 4 miniport driver for Windows 95 and Windows NT. This driver is enabled for DynamicAccess Class of Service. Follow the instructions in Chapter 4, "Installing a Network Driver for Windows 95," or Chapter 6, "Installing a Network Driver for Windows NT," to install this driver.

To obtain drivers for network operating systems not included on the *TokenDisk* diskettes, contact the network operating system (NOS) manufacturer or use the IBM drivers supplied with the NOS.

For a list of supported drivers, software driver updates, and patches for the drivers on the *TokenDisk* diskettes, refer to the 3Com online delivery services listed in Appendix B, "Technical Support."

Before Installing Drivers

The 3C319 NIC must be installed in the PC, as described in Chapter 2, "Installing the 3C319 NIC."

The drivers described in this chapter are not PnP-enabled. Before installing a driver, be sure to disable PnP and manually configure the NIC using the procedures described in Chapter 5, "Configuring the NIC Manually."

Installing the Client Driver for NetWare

If you did not use the AutoLink configuration utility, follow these steps to install the DOS ODI client driver for NetWare:

1. **Make sure the 3C319 NIC is configured as described in Chapter 5, "Configuring the NIC Manually."**
2. **Start the Install program on *TokenDisk* diskette #1.**
3. **From the main menu shown in Figure 8-1, select *Driver Installation and Update...* and press [Enter].**

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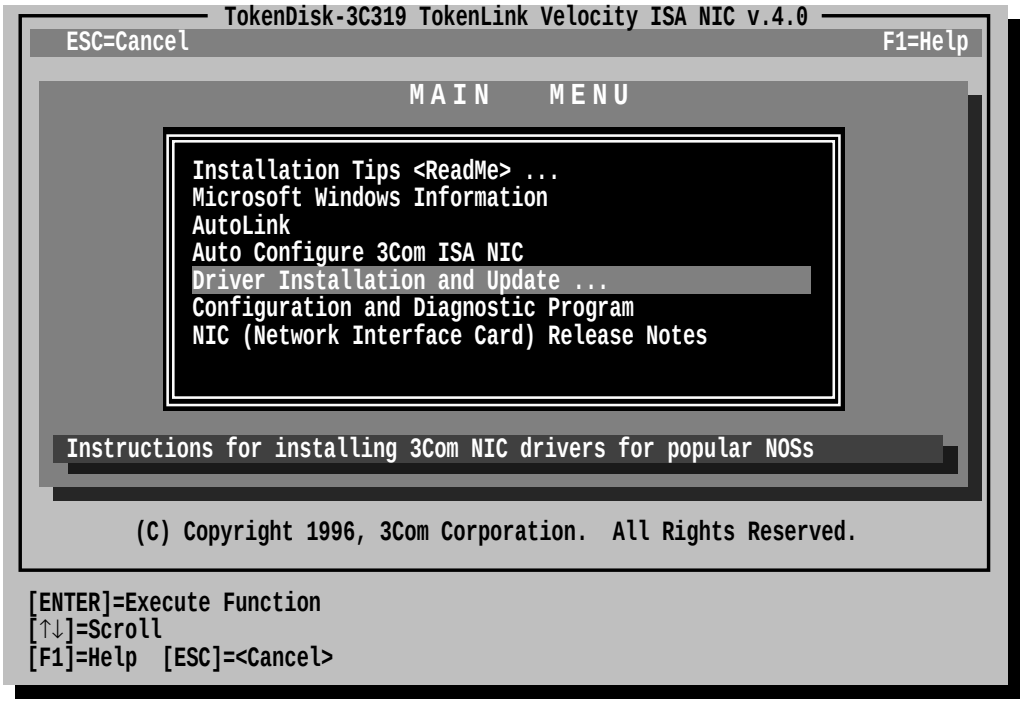

Figure 8-1 Main Menu with Driver Installation and Update Selected

4 Select *Install Novell NetWare Driver,* as shown in Figure 8-2, and press [Enter].

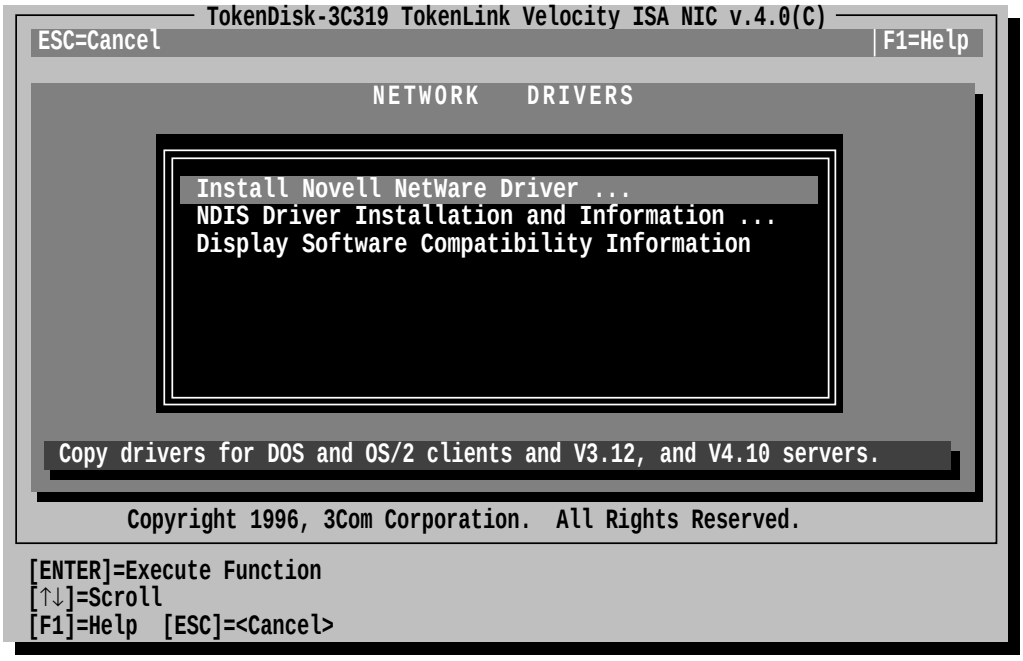
TokenDisk-3C319 TokenLink Velocity ISA NIC v.4.0(C)
ESC=Cancel
F1=Help
NETWORK DRIVERS
Install Novell NetWare Driver ...
NDIS Driver Installation and Information ...
Display Software Compatibility Information
Copy drivers for DOS and OS/2 clients and V3.12, and V4.10 servers.
Copyright 1996, 3Com Corporation. All Rights Reserved.
[ENTER]=Execute Function
[↑↓]=Scroll
[F1]=Help [ESC]=<Cancel>

Figure 8-2 Network Drivers Menu

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5 **When the NetWare Driver screen appears, select *Copy DOS ODI Client Driver*.**

6 **At the prompt, accept the \NWCLIENT directory as the default for the destination of the driver, or enter a new path.**

The NetWare driver and NET.CFG file are copied to your PC.

7 **Exit to DOS.**

8 **Edit the AUTOEXEC.BAT file and add the following lines:**

```
C:\path\LSL
C:\path\3CTOKEN
C:\path\IPXODI
C:\path\VLM
F:
LOGIN
```

C: \ path\ is the directory you choose for the NetWare client files and the DOS ODI driver. Use the latest Novell files from the Novell forum on the CompuServe site or from your authorized reseller.

9 **Edit your CONFIG.SYS file and include these statements:**

```
Files= <value>
Buffers= <value>
Lastdrive= Z
```

Novell recommends that <*value*> be at least 20 for each statement.

10 **Remove *TokenDisk* diskette #1 from the floppy drive.**

11 **Reboot your PC.**

This completes the manual NetWare DOS ODI client driver installation.

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Installing the OS/2 Network Driver for NetWare

TokenDisk diskette #1 includes the Novell NetWare OS/2 ODI driver (\NWCLIENT\3CTOKEN.SYS). The \HELP\NWOS2ODI.TXT file includes instructions for installing this driver.

Installing the Server Driver for NetWare

The NW410 directory on *TokenDisk* diskette #1 includes the driver and files for Novell NetWare 3.12 and 4.x servers. Refer to Novell documentation for instructions on using the INSTALL.NLM file to install the drivers for the 3C319 NIC, or follow the instructions provided under the *Installation Tips <Readme>* menu option on the main menu, shown in Figure 8-1.

Installing the NDIS 2.01 Driver

Select *Installation Tips <Readme>* on the main menu shown in Figure 8-1 for instructions on installing the NDIS 2.01 driver in supported network operating systems.

Instructions are included for using *TokenDisk* diskette #1 as an automatic OEM import disk for IBM LAN Server, Microsoft LAN Manager, Microsoft Windows for Workgroups, and other network operating systems.

Installing a Driver for Windows for Workgroups

This section describes how to use the Help program on *TokenDisk* diskette #1 to view driver installation instructions for:

- NetWare client PCs running Windows for Workgroups
- PCs running Windows for Workgroups and using the NDIS 3 protected-mode driver
- PCs running Windows for Workgroups and using the NDIS 2 real-mode driver

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Before Installing the Driver

Before installing the driver, make sure that the following procedures have been completed:

- The 3C319 NIC has been installed as described in Chapter 2.
- Plug and Play (PnP) has been manually disabled as described in Chapter 5, "Configuring the NIC Manually."

Windows for Workgroups is not a PnP-enabled operating system.

- The NIC has been manually configured as described in Chapter 5, "Configuring the NIC Manually."

Viewing the Driver Installation Instructions

Follow these steps to view the instructions:

1. **Exit to the DOS prompt.**
2. **Insert *TokenDisk* diskette #1 in drive A and type at the prompt:**

   `a:\help [Enter]`
3. **From the main *Help* menu, select *Windows* and press [Enter].**
4. **From the Windows *Help* menu, select one of the following and press [Enter]:**
   - NDIS 3 (protected-mode driver)
   - NDIS 2 (real-mode driver)
   - NetWare (real-mode driver)

When using non-Novell protocol stacks (for example, Microsoft IPX protocol stacks with the NetWare client driver), you must disable the Parallel Tasking feature of the 3C319 NIC. The procedure is described in the NetWare (real-mode driver) Help file.

To complete the installation, follow the directions on the screen.

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Using IBM Drivers

Since the 3C319 NIC is fully IBM-compatible you can use drivers for IBM 16/4 Token Ring Adapters.

Obtain IBM token ring drivers for the 3C319 NIC in one of the following ways:

- Copy the IBM 16/4 Token Ring Adapter drivers supplied with your network operating system.
- Use the IBM 16/4 Token Ring Adapter drivers in IBM's LAN Support Program version 1.2 or later.

With IBM drivers, use only IBM-compatible settings.

To use the IBM 16/4 Token Ring Adapter drivers supplied with your network operating system, copy them to your PC and follow the instructions that accompany the network operating system.

Using Remote Program Load (RPL)

The Remote Program Load capability included with the 3C319 NIC allows you to load boot images from Novell NetWare, IBM LAN Server, Microsoft LAN Manager, and Banyan VINES servers.

If RPL is enabled on the NIC and on the network server, the PC can boot from a server on the token ring network using the configured NIC. This eliminates the need to use local drives or diskettes.

RPL can be disabled to allow the PC to boot from its hard disk using 3Com's 3TRDIAG program. You can also use IBM's installation and RPL operation documentation for 3C319 NIC procedures.

The RPL capability can only be used with:

- I/O base addresses A20h or A24h
- Shared RAM address D8000

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- BIOS/MMIO address CC000
- IRQs 2, 3, 6, or 7

RPL is not supported on the 3C319 NIC in an EISA PC with the AutoSwitch function enabled.

Before Using RPL

To use RPL, enable the boot PROM feature on the NIC and use the procedures that follow.

Refer to your network operating system documentation for instructions on how to create a boot image that loads the IBM token ring driver.

Enabling RPL

The following procedure explains how to enable RPL. Refer to your network operating system documentation for network procedures and for information on drivers that you can load with RPL.

1. **Boot your PC under DOS.**
2. **Insert the backup copy of *TokenDisk* diskette #1 in a floppy drive.**
3. **At the prompt, type:**

   `3trdiag [Enter]`
4. **From the *Install* pull-down menu, select *Configure NIC*.**
5. **Using the arrow keys, select *Boot PROM*.**
6. **Press [Enter] and select *Enable*.**
7. **Press [Enter].**
8. **Select *OK* and press [Enter] to save the setting.**
9. **Remove the diskette from the drive and reboot the PC.**

   If your PC has a hard drive, the following message appears on your screen:

   `Type H to boot from the hard disk`

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10 **Type H to boot your PC from your local hard disk. Otherwise, the PC will boot from the network server.**

Disabling RPL

To disable RPL, use the following procedure:

1 **Boot your PC under DOS.**

2 **Insert the backup copy of *TokenDisk* diskette #1 in a floppy drive.**

3 **At the prompt, type:**

```
3trdiag [Enter]
```

4 **From the *Install* pull-down menu, select *Configure NIC*.**

5 **Using the arrow keys, select *Boot PROM*.**

6 **Press [Enter], and select *Disable*.**

7 **Press [Enter].**

8 **Select *OK* and press [Enter] to save the setting.**

9 **Remove the diskette from the drive and reboot the PC.**

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9 TROUBLESHOOTING NIC INSTALLATION

This chapter describes how to isolate and solve 3C319 NIC hardware and network cabling problems in the following sections:

- 3C319 NIC LEDs
- Using the Configuration and Diagnostic Program
- Diagnostic Test Types
- Troubleshooting Tips

3C319 NIC LEDs

Light-emitting diodes (LEDs) on the backplate of the 3C319 NIC, shown in Figure 9-1, indicate the configured ring speed and whether or not the 3C319 NIC is inserted into the ring. The LEDs also light when drivers are loading and when the diagnostics program is running.

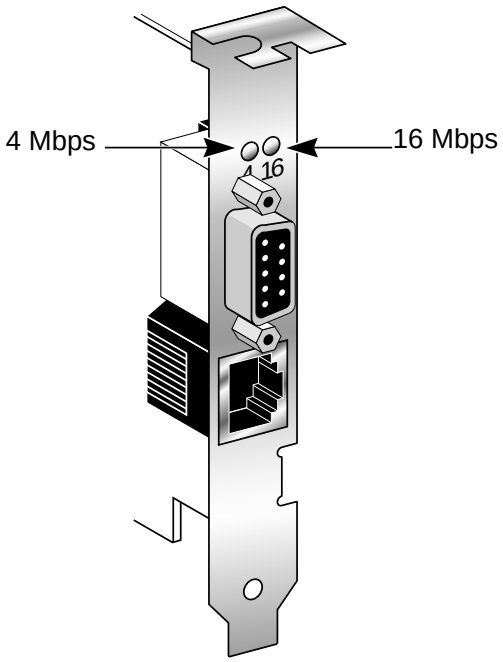

Figure 9-1 NIC LEDs

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When the green LED (labeled "4") is lit, it indicates that the 3C319 NIC is set to 4 Mbps speed and is correctly inserted into the token ring network.

When the yellow LED (labeled "16") is lit, it indicates that the 3C319 NIC is set to 16 Mbps and is correctly inserted into the token ring network.

Using the Configuration and Diagnostic Program

You can run the Configuration and Diagnostic Program on *TokenDisk* diskette #1 to test the setup or configuration and test for physical board problems.

The diagnostic program tests the 3C319 NIC, not the network. Boot from DOS before running the diagnostic program. Connect the 3C319 NIC to the network for all diagnostic tests.

*The Configuration and Diagnostic Program is a DOS application that does **not** function properly if the 3C319 NIC drivers are already installed. The program also indicates memory conflicts if you run it with a memory manager without excluding the memory range used by the 3C319 NIC. You must bypass the drivers and the memory manager before you run the diagnostic program. Use a DOS diskette if you are running DOS 5.0 or earlier.*

If you are running Windows NT, boot from the DOS partition or boot from a DOS diskette to run the diagnostic program. If you use Windows 95 or Windows for Workgroups, exit Windows and restart the PC in MS-DOS mode, or boot from a floppy that has the operating system installed on it.

Diagnostic Test Types

There are two groups of Configuration and Diagnostic Program tests.

A lobe cable must be connected from the 3C319 NIC to a retiming concentrator or MAU for all Group 1 tests. A lobe cable is the section of cable that attaches a ring station or network device to a MAU or wiring hub.

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Group 1 Diagnostics

Group 1 diagnostics test physical components, connectors, and circuitry of the 3C319 NIC as follows.

MMIO Register Write/Read Test

This test verifies that the PC can access the 3C319 NIC's memory mapped I/O registers correctly.

Boot PROM Test

This test verifies that the PC can access the boot PROM correctly and verifies the integrity of the boot PROM.

AIP Checksum Test

This test verifies that the 3C319 NIC's node ID, channel identifier, and supported function identifiers such as data rate, shared RAM, and transmit buffer size are correct.

Shared RAM Boundary/Domain Test

This test verifies that the shared RAM base address is aligned on the proper address boundary according to the shared RAM page size setting and verifies that its domain does not conflict with that of the 3C319 NIC ROM.

Shared RAM Write/Read Test

This test verifies that the PC can correctly access the total 64 KB of available shared RAM.

Timer Test

This test verifies the 3C319 NIC's timer operations by comparing the 3C319 NIC timing to the PC's timing.

Open NIC for Ring Operation Test

This test prepares the 3C319 NIC for a NIC ring operation test and verifies the 3C319 NIC's ability to transmit data over the network. This test requires you to connect to an STP or a UTP cable with a DAU, MAU, CAU, or token ring switch at the other end.

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Ring Operations Test

This test assesses communication on the ring. The 3C319 NIC must be attached to the ring to run this test successfully. The 3C319 NIC also must be set to the correct ring speed. Note that this test always fails when you are using a Dedicated Token Ring (DTR) hub.

Close NIC Test

This test verifies the 3C319 NIC's ability to close the 3C319 NIC and terminate the Ring Operations Test. The 3C319 NIC must have been previously opened.

Group 2 Diagnostic

The Group 2 diagnostic test (NIC Wrap Test) causes all user-transmitted data to be sent and received without going to the network.

A lobe cable must be connected from the selected 3C319 NIC to a retiming concentrator or MAU for the Group 2 test. A lobe cable is the section of cable that attaches a ring station or network device to a MAU or wiring hub.

Running the Diagnostic Tests

The Configuration and Diagnostic Program can be started from the menus or the DOS command line. For command line instructions, see the INSTRUCT.TXT file in the \HELP subdirectory on *TokenDisk* diskette #1.

1 **Insert *TokenDisk* diskette #1 in the floppy drive and type:**

```
a:\ [Enter]
```

2 **To start the diagnostic program, type:**

```
3trdiag [Enter]
```

The Configuration and Diagnostic Program main window appears, as shown in Figure 9-2.

3 **Use the arrow keys to select the *Test* pull-down menu shown in Figure 9-2.**

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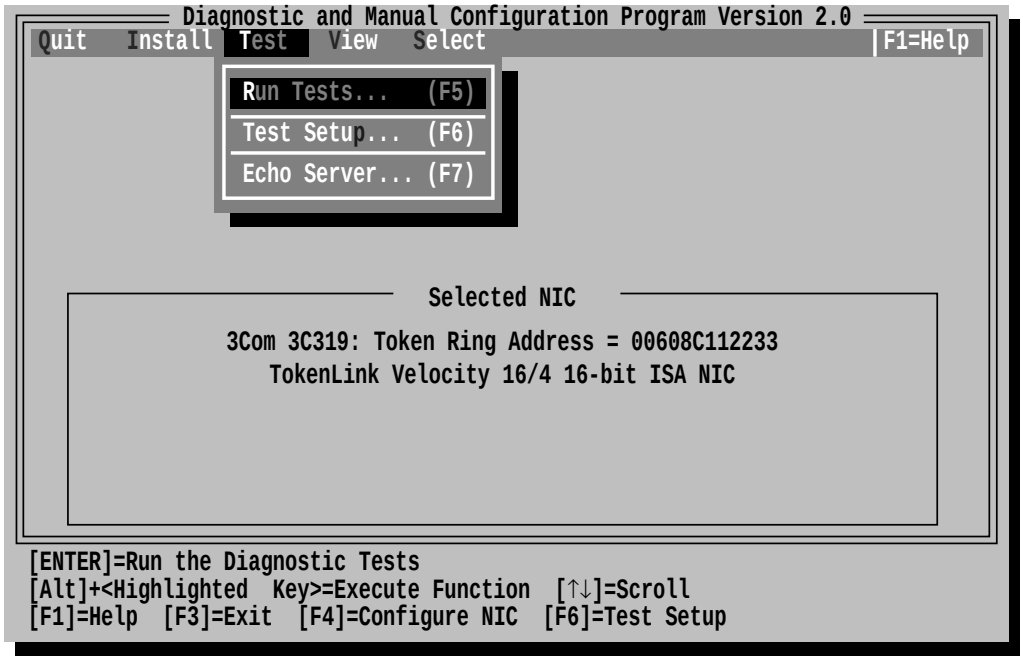
Diagnostic and Manual Configuration Program Version 2.0
Quit Install Test View Select F1=Help
Run Tests... (F5)
Test Setup... (F6)
Echo Server... (F7)
Selected NIC
3Com 3C319: Token Ring Address = 00608C112233
TokenLink Velocity 16/4 16-bit ISA NIC
[ENTER]=Run the Diagnostic Tests
[Alt]+<Highlighted Key>=Execute Function [↑↓]=Scroll
[F1]=Help [F3]=Exit [F4]=Configure NIC [F6]=Test Setup

Figure 9-2 Configuration and Diagnostic Program Main Window

4 Select *Run Tests.*

The Run Tests dialog box appears, similar to the one shown in Figure 9-3.

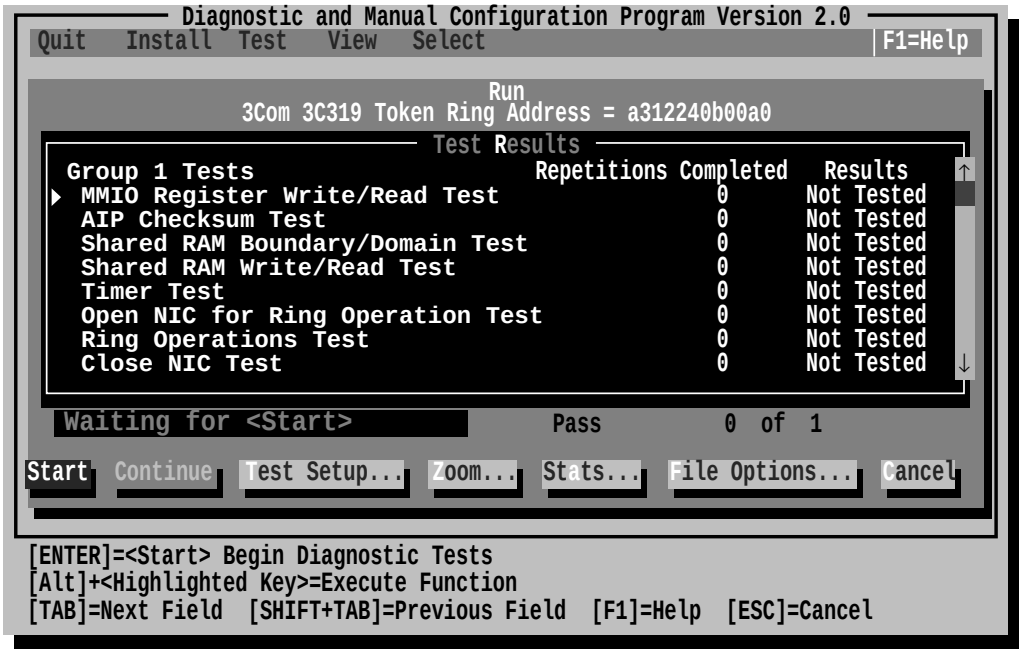
Diagnostic and Manual Configuration Program Version 2.0
Quit Install Test View Select F1=Help
Run
3Com 3C319 Token Ring Address = a312240b00a0
Test Results
Group 1 Tests Repetitions Completed Results
MMIO Register Write/Read Test 0 Not Tested
AIP Checksum Test 0 Not Tested
Shared RAM Boundary/Domain Test 0 Not Tested
Shared RAM Write/Read Test 0 Not Tested
Timer Test 0 Not Tested
Open NIC for Ring Operation Test 0 Not Tested
Ring Operations Test 0 Not Tested
Close NIC Test 0 Not Tested
Waiting for <Start> Pass 0 of 1
Start Continue Test Setup... Zoom... Stats... File Options... Cancel
[ENTER]=<Start> Begin Diagnostic Tests
[Alt]+<Highlighted Key>=Execute Function
[TAB]=Next Field [SHIFT+TAB]=Previous Field [F1]=Help [ESC]=Cancel

Figure 9-3 Run Tests Dialog Box

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5 Press [Enter] to start the tests.

Each test runs once unless you specify otherwise. The test results are displayed on the screen with "Passed" or "Failed" in the Results column.

To run the tests continuously, select the *Continuous* option in the Test Setup dialog box, as described in the next section, "Changing the Test Setup."

Changing the Test Setup

To change the test parameters, follow these steps:

1 Select *Test Setup* in the Run Tests dialog box and press [Enter].

The Test Setup dialog box appears, as shown in Figure 9-4.

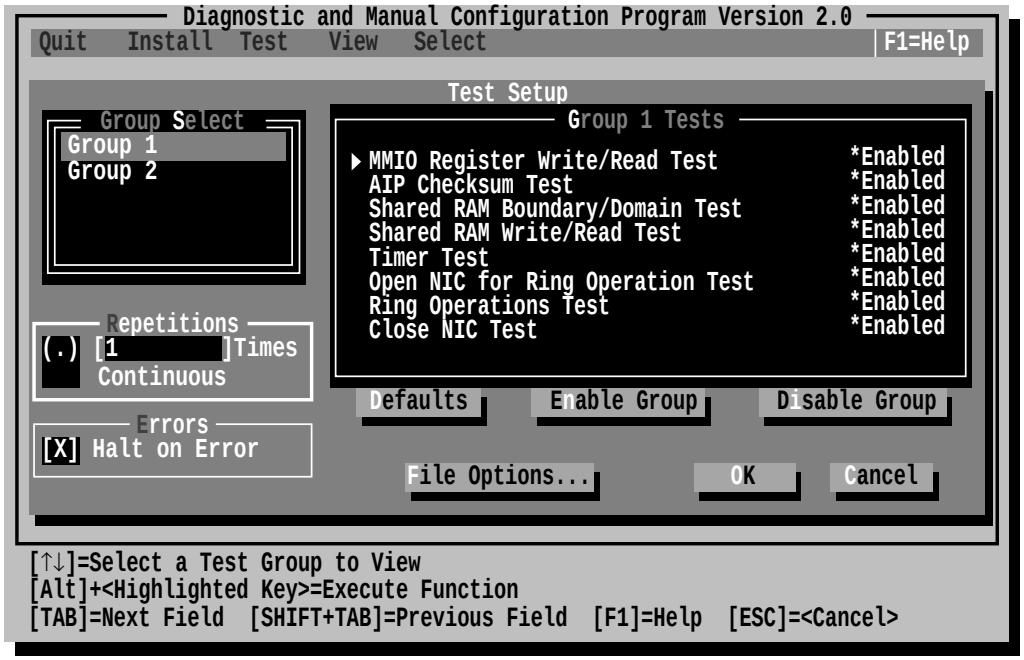

Figure 9-4 Test Setup Dialog Box

2 Press [Tab] to move from field to field and select any field within the Test Setup dialog box.

Within the Group Select area, use the arrow keys to select Group 1 or Group 2. Use the *Enable Group* or *Disable Group* options to enable or disable a group of tests.

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For a description of these tests, refer to the online help in the diagnostic program.

3 **Select *OK* and press [Enter].**

The Run Tests Dialog box reappears (Figure 9-3).

4 **To run the tests, select *Start* and press [Enter].**

Troubleshooting Tips

If a diagnostic test fails, the 3C319 NIC may not be defective. The problem is usually incorrect option settings or option settings that conflict with the settings of other boards, or the 3C319 NIC may be improperly installed.

Windows NT versions 3.51 and 4.0 are not PnP-enabled operating systems. If the network driver fails to load when the 3C319 NIC is installed in a PnP PC, configure the NIC using the Configuration and Diagnostic Program on TokenDisk diskette #1. Follow the procedures in Chapter 5, "Configuring the NIC Manually," to disable PnP for the 3C319 NIC and then configure the NIC.

If a test fails, you can get additional information by highlighting the test that failed in the Run Tests dialog box and pressing [Enter]. You can also highlight the *Zoom* button and press [Enter]. The program notifies you of the error and suggests actions for solving the problem.

CAUTION: *Turn off the power before inserting or removing the 3C319 NIC from the PC.*

Follow these steps to isolate the problem further:

1 **Seat the 3C319 NIC firmly in the slot.**

2 **Inspect all cables and connections.**

3 **Make sure that the LEDs on the 3C319 NIC and the MAU light, or that the solenoid on the MAU engages.**

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4 **Ensure that the settings (memory allocations, interrupts, etc.) for the 3C319 NIC do not conflict with other devices installed in the PC.**

See Table 2-1 for initial settings set by 3Com for configuration options. See Chapter 5, "Configuring the NIC Manually," for a description of the settings.

5 **Check that the ring speed (4 or 16) matches the network speed.**

Select the *View* pull-down menu in the Configuration and Diagnostic Program and select *NIC Information* to view the current 3C319 NIC configuration.

6 **If you installed the 3C319 NIC correctly and still experience problems, review your configuration procedures.**

Make sure that you have properly configured your PC for the 3C319 NIC. Refer to Chapter 5, "Configuring the NIC Manually."

Make sure that you have installed the correct drivers for your network operating system. Refer to Chapters 4, 6, and 8.

7 **Install the 3C319 NIC in another slot and run the diagnostic tests again to isolate a defective slot.**

The slot may be defective. If the 3C319 NIC passes the tests in the second slot, contact the reseller or manufacturer of the PC.

8 **Install the 3C319 NIC in another functioning PC and run the tests again.**

Your PC may be defective. If the 3C319 NIC passes the tests in the second PC, contact the reseller or manufacturer of the first PC.

9 **Replace the failed 3C319 NIC with a working 3C319 NIC. If the second 3C319 NIC fails, the PC may be defective.**

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10 Try a different lobe cable.

11 Verify that you have the latest software drivers from the network vendor for the network operating system (NOS) that you are using.

Press the [F1] key for Help information at any time during operation of the Configuration and Diagnostic Program. Appendix B, "Technical Support," contains sources of online information. In addition, the SYSRESRC.TXT file in the \HELP subdirectory contains information about commonly used interrupts and I/O base addresses.

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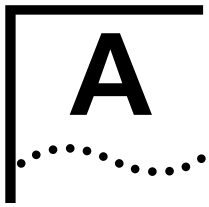

SPECIFICATIONS

This appendix provides specifications for:

- Cabling
- Pin assignments

Cabling

The 3C319 NIC supports industry-standard token ring cabling that meets IEEE 802.5 specifications. Use Category 3, 4, or 5 unshielded twisted-pair (UTP) or types 1 or 6 shielded twisted-pair (STP) cabling.

Pin Assignments

The 3C319 NIC can be connected to a network with either a DB-9 or an RJ-45 connector. Figure A-1 and Figure A-2 show the pin assignments for these connectors.

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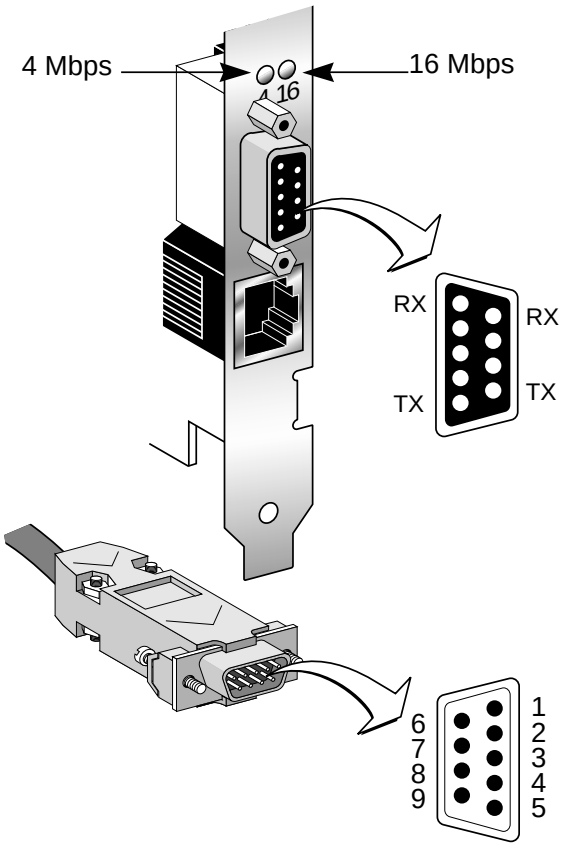

Figure A-1 DB-9 Connector Pin Assignments

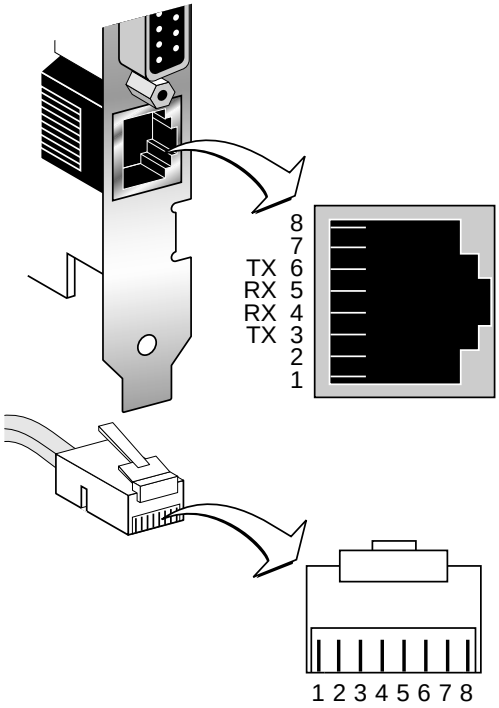

Figure A-2 RJ-45 Connector Pin Assignments

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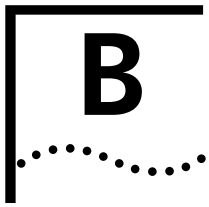

TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, we recommend that you access 3Com Corporation's World Wide Web site.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com Bulletin Board Service (3ComBBS)
- 3ComFacts℠ automated fax service
- 3ComForum on CompuServe online service

World Wide Web Site

Access the latest networking information on 3Com Corporation's World Wide Web site by entering our URL into your Internet browser:

`http://www.3com.com/`

This service features the latest information about 3Com solutions and technologies, customer service and support, news about the company, *Net Age*® Magazine, and more.

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3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	61 2 9955 2073
Brazil	up to 14400 bps	55 11 547 9666
France	up to 14400 bps	33 1 6986 6954
Germany	up to 28800 bps	4989 62732 188
Hong Kong	up to 14400 bps	852 2537 5608
Italy (fee required)	up to 14400 bps	39 2 27300680
Japan	up to 14400 bps	81 3 3345 7266
Mexico	up to 28800 bps	52 5 520 7853
P.R. of China	up to 14400 bps	86 10 684 92351
Singapore	up to 14400 bps	65 534 5693
Taiwan, R.O.C.	up to 14400 bps	886 2 377 5840
U.K.	up to 28800 bps	44 1442 438278
U.S.A.	up to 28800 bps	1 408 980 8204

Access by Digital Modem

ISDN users can dial in to 3ComBBS using a digital modem for fast access up to 56 Kbps. To access 3ComBBS using ISDN, use one of the following numbers:

408 654 2706 or **408 654 2703**

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3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone using one of these international access numbers:

Country	Telephone Number
U.K.	44 1442 438279
U.S.A.	1 408 727 7021

Local access numbers are available within the following countries:

Country	Telephone Number	Country	Telephone Number
Australia	1800 678 515	Netherlands	06 0228049
Belgium	0800 71279	New Zealand	0800 446 398
Denmark	800 17319	Norway	800 11062
Finland	98 001 4444	Portugal	0505 442 607
France	05 90 81 58	Russia (Moscow only)	956 0815
Germany	0130 81 80 63	Singapore	800 6161 463
Hong Kong	800 933 486	Spain	900 964 445
Italy	1678 99085	Sweden	020 792954
Malaysia	1800 801 777	U.K.	0800 626403

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3ComForum on CompuServe Online Service

3ComForum contains patches, software, drivers, and technical articles about all 3Com products, as well as a messaging section for peer support. To use 3ComForum, you need a CompuServe account.

To use 3ComForum:

1. **Log on to your CompuServe account.**
2. **Type `go threecom`**
3. **Press [Return] to see the 3ComForum main menu.**

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

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Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

Contact your local 3Com sales office to find your authorized service provider using one of these numbers:

Regional Sales Office	Telephone Number
3Com Corporation	
P.O. Box 58145 5400 Bayfront Plaza Santa Clara, California 95052-8145 U.S.A.	800 NET 3Com *or* 1 408 764 5000 408 764 5001 (fax)
3Com Asia Limited	
Australia	61 2 9937 5000 (Sydney) 61 3 9866 8022 (Melbourne)
Hong Kong	852 2501 1111
India	91 11 644 3974
Indonesia	62 21 572 2088
Japan	81 6 536 3303 (Osaka) 81 3 3345 7251 (Tokyo)
Korea	82 2 319 4711
Malaysia	60 3 732 7910
New Zealand	64 9 366 9138
Philippines	632 892 4476
P.R. of China	8610 68492568 (Beijing) 86 21 63501581 (Shanghai)
Singapore	65 538 9368
Taiwan, R.O.C.	886 2 377 5850
Thailand	662 231 8151 5
3Com Benelux B.V.	
Belgium	32 2 725 0202
Netherlands	31 30 6029700
3Com Canada	
Calgary	403 265 3266
Edmonton	403 423 3266
Montreal	514 683 3266
Ottawa	1 613 566 7055
Toronto	416 498 3266
Vancouver	604 434 3266
3Com France	33 1 69 86 68 00

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Regional Sales Office	Telephone Number
3Com GmbH	
Austria	43 1 513 4323
Czech Republic/Slovak Republic	420 2 21845 800
Germany	49 30 34 98790 (Berlin)
(Central European HQ)	49 89 627320 (Munich)
Hungary	36 1 250 83 41
Poland	48 22 6451351
Switzerland	41 31 996 14 14
3Com Iberia	
Portugal	351 1 3404501
Spain	34 1 383 17 00
3Com Ireland	353 1 820 7077
3Com Latin America	
U.S. Headquarters	408 326 2093
Northern Latin America	305 261 3266 (Miami, Florida)
Argentina	541 312 3266
Brazil	55 11 5181 0869
Chile	562 633 8935
Colombia	571 629 4110
Mexico	52 5 520 7841/7847
Peru	51 1 221 5399
Venezuela	58 2 953 8122
3Com Mediterraneo	
Italy	39 2 253011 (Milan) 39 6 5279941 (Rome)
3Com Middle East	971 4 349049
3Com Nordic AB	
Denmark	45 39 27 85 00
Finland	358 0 435 420 67
Norway	47 22 58 47 00
Sweden	46 8 632 56 00
3Com Russia	007 095 258 09 40
3Com Southern Africa	27 11 807 4397
3Com UK Ltd.	44 131 240 2900 (Edinburgh) 44 161 873 7717 (Manchester) 44 162 889 7000 (Marlow)

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Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain a Return Materials Authorization (RMA) number. Products sent to 3Com without RMA numbers will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S.A. and Canada	1 800 876 3266, option 2	408 764 7120
Latin America	1 408 326 2927	408 764 7120
Europe, South Africa, and Middle East	44 1442 438125	44 1442 435822
Elsewhere	1 408 326 2926	1 408 764 7120

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GLOSSARY

3Com mode
: A mode of operation for the 3Com TokenLink Velocity ISA network interface card (NIC) that provides increased throughput and expanded configuration options.

CAU
: Controlled access unit.

Class of Service
: A 3Com DynamicAccess feature that helps to optimize network performance by letting you prioritize your applications for efficient network access. High-priority tokens are requested when the network transmits data for selected applications.

Clean boot
: A DOS boot with no memory managers or other programs (such as drivers) loaded in memory.

DAU
: Dual access unit.

Driver
: A program, usually resident in the server or workstation memory, that controls the network hardware (such as NICs or controllers) or implements the protocol stacks through which higher-level applications communicate with the network hardware.

DTR
: Dedicated Token Ring (DTR). An IEEE standard that increases network performance in switched token ring environments. It allows data transmission using dedicated resources between the station and the concentrator. Transmissions can be either half-duplex or full-duplex.

DynamicAccess technology
: A 3Com set of features that optimize network performance. (*See also* Class of Service.)

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EISA

Extended Industry Standard Architecture.

Full-duplex

A mode of operation in which a token ring station can simultaneously transmit and receive independent data streams. Dedicated transmissions occur between the station and switch; token passing no longer occurs.

Hexadecimal

A number system with a base of sixteen. In hexadecimal, the first ten digits are 0–9 and the last six digits are A–F. This number system is identified in this guide by a number or character followed by "h."

IBM mode

A mode of operation for 3Com TokenLink Velocity ISA NICs with configuration options restricted to the same options provided by IBM 16/4 Token Ring Adapters. Either 3Com or IBM drivers can be used when the NIC is configured in IBM mode.

IEEE 802.5

The standard for the token ring access method and physical layer specifications developed by a subcommittee of the Institute for Electrical and Electronics Engineers (IEEE) 802 committee.

Input/Output (I/O)

The method, medium, or device (such as a keyboard, monitor, floppy disk, hard disk, NIC, or printer) used to transfer data to a PC or from the PC back to a device or a network.

ISA

Industry Standard Architecture.

LAN

Local area network. A communications network within a limited physical area such as a building that provides high-speed data transmission. The basic components of a LAN are the boards that plug into each PC to connect it to the network, cabling, server hardware, and software for network control.

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Lobe

All network components in a specific area that physically connect to a specific MAU or wiring hub.

Lobe cable

The section of cable that attaches a ring station or network device to a MAU or wiring hub.

MAU

Multistation access unit.

NDIS

Network Driver Interface Specification. A software specification used in many operating systems to create drivers for network NICs. NDIS drivers support multiple protocols and multiple NICs and can be unloaded from memory to conserve conventional DOS RAM space. NDIS permits the high-level protocol components to be independent of the NIC by providing a standard interface. Windows NT and Windows 95 support NDIS 3.0 and NDIS 4.0.

NET.CFG

An ASCII file containing control information for network protocol elements of stations and servers for a Novell NetWare environment.

Network

A series of nodes such as PCs, terminals, or other peripherals interconnected by a communications channel.

NIC

A network interface card (NIC) is a circuit board located inside each PC and server on the network. It allows the device to listen and talk to other stations and nodes on the network.

ODI

Open Data-link Interface. A MAC-level specification developed by Novell and Apple Computer. Like NDIS, the ODI driver supports multiple protocols and NICs and can be unloaded from memory to conserve conventional DOS RAM space.

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Parallel Tasking architecture

A proprietary technique developed and patented by 3Com that provides significant performance improvement by allowing network interchanges of data to occur in parallel.

Plug and Play (PnP)

A standard that defines automatic techniques for making PC configuration simple and straightforward. Read-only memory (ROM) chips with unique identification numbers are added to each NIC, and the NIC can then arbitrate conflicts with interrupts, input/output ports, and memory.

Protocol

A formalized set of rules that PCs use to communicate. Because of the complexity of communications between PCs and the need for different communication requirements, protocols have been divided into modular layers, in which each layer performs a specific function for an adjacent layer.

Protocol layers

A model for describing the hierarchical set of or levels of protocols in which each protocol layer obtains services from the layer below it and performs services for the layer above it.

PROTOCOL.INI

An ASCII file containing control information for network protocol elements of NDIS network stations and servers.

Token ring

A network that employs a ring topology and passes tokens for ring access.

TSR

Terminate and stay resident. A program that upon execution, loads itself (or an executable portion of itself) into PC working memory (RAM).

WAN

Wide area network. A network covering large distances (50 square miles or more) that may include packet-switched, or public data, and value-added networks.

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from the one which the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

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The Interference Handbook

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